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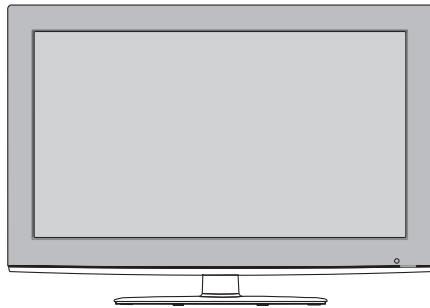
# LED LCD TV SERVICE MANUAL

**CHASSIS : LA01U**

**MODEL : 32LV3500      32LV3500-UA**  
**32LV3520      32LV3520-UC**

## **CAUTION**

BEFORE SERVICING THE CHASSIS,  
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



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# SAFETY PRECAUTIONS

## IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by  in the Schematic Diagram and Exploded View.

It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.

Do not modify the original design without permission of manufacturer.

### General Guidance

An **isolation Transformer** should always be used during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and its components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1W), keep the resistor 10mm away from PCB.

Keep wires away from high voltage or high temperature parts.

### Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

### Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.

If the exposed metallic part has a return path to the chassis, the measured resistance should be between  $1M\Omega$  and  $5.2M\Omega$ .

When the exposed metal has no return path to the chassis the reading must be infinite.

An other abnormality exists that must be corrected before the receiver is returned to the customer.

### Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

#### **Do not use a line Isolation Transformer during this check.**

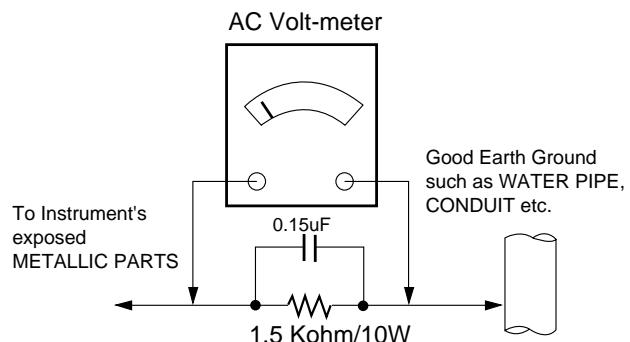
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.

Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which corresponds to 0.5mA.

In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

### Leakage Current Hot Check circuit



# SERVICING PRECAUTIONS

**CAUTION:** Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the **SAFETY PRECAUTIONS** on page 3 of this publication.

**NOTE:** If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

## General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
  - a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
  - b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
  - c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
- CAUTION:** A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe.  
Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)  
**CAUTION:** This is a flammable mixture.  
Unless specified otherwise in this service manual, lubrication of contacts is not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.  
Always remove the test receiver ground lead last.
8. *Use with this receiver only the test fixtures specified in this service manual.*  
**CAUTION:** Do not connect the test fixture ground strap to any heat sink in this receiver.

## Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called **Electrostatically Sensitive (ES) Devices**. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the

unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.  
**CAUTION:** Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

## General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range of 500°F to 600°F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a small wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle.  
Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
  - a. Allow the soldering iron tip to reach normal temperature. (500°F to 600°F)
  - b. Heat the component lead until the solder melts.
  - c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.  
**CAUTION:** Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
  - a. Allow the soldering iron tip to reach a normal temperature (500°F to 600°F)
  - b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
  - c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.  
**CAUTION:** Work quickly to avoid overheating the circuit board printed foil.
  - d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

## **IC Remove/Replacement**

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

### *Removal*

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

### *Replacement*

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

## **"Small-Signal" Discrete Transistor**

### **Removal/Replacement**

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

## **Power Output, Transistor Device**

### **Removal/Replacement**

1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

### **Diode Removal/Replacement**

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

### **Fuse and Conventional Resistor**

### **Removal/Replacement**

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.

**CAUTION:** Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

## **Circuit Board Foil Repair**

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

### *At IC Connections*

To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

### *At Other Connections*

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side.  
Carefully crimp and solder the connections.

**CAUTION:** Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

# SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

## 1. Application range

This spec sheet is applied LCD TV with LA01U chassis.

## 2. Requirement for Test

Each part is tested as below without special appointment.

- 1) Temperature: 25 °C ± 5 °C
- 2) Relative Humidity: 65 ± 10 %
- 3) Power Voltage : Standard input voltage(100-240V~, 50/60Hz)  
\* Standard Voltage of each product is marked by models

- 4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
- 5) The receiver must be operated for about 5 minutes prior to the adjustment.

## 3. Test method

- 1) Performance: LGE TV test method followed
- 2) Demanded other specification
  - Safety : UL, CSA, IEC specification
  - EMC: FCC, ICES, IEC specification

## 4. General Specification(TV)

No	Item	Specification		Remark
1	Receivable System	1) ATSC / NTSC-M		
2	Available Channel	1) VHF : 02 ~ 13 2) UHF : 14 ~ 69 3) DTV : 02 ~ 69 4) CATV : 01 ~ 135 5) CADTV : 01 ~ 135		
3	Input Voltage	1) AC 100 - 240V~ 50/60Hz		Mark : 110V, 60Hz (N.Ame)
4	Market	North America		
5	Screen Size	32 inch Wide (1920x1080) 37 inch Wide (1920x1080) 42 inch Wide (1920x1080) 47 inch Wide (1920x1080) 55 inch Wide (1920x1080) 32 inch Wide (1366x768)	FHD + 60Hz FHD + 60Hz FHD + 60Hz FHD + 60Hz FHD + 60Hz HD + 60Hz	32LV3500-UA / 32LV3520-UC 37LV3500-UA 42LV3500-UA / 42LV3520-UC 47LV3500-UA 55LV3500-UA 32LV2500-UA
6	Aspect Ratio	16:9		
7	Tuning System	FS		
8	LCD Module	T315HW07-V8 LC320EUN-SDV2 T370HW05-V1 V420H20-LE5 T420HW08-V1 LC420EUN-SDV3 LC470EUE-SDV1 LC550EUF-SDA1 LC320EXN-SDA1 T315XW06-V3 T546HW04-V0 LC370EUN-SDV2 V315H3-LE7	AUO LGD AUO CMI AUO LGD LGD LGD LGD AUO AUO LGD CMI	32LV3500-UA / 32LV3520-UC 32LV3500-UA / 32LV3520-UC 37LV3500-UA 42LV3500-UA / 42LV3520-UC 42LV3500-UA / 42LV3520-UC 42LV3500-UA / 42LV3520-UC 47LV3500-UA 55LV3500-UA 32LV2500-UA 32LV2500-UA 55LV3500-UA 37LV3500-UA 32LV3500-UA / 32LV3520-UC
9	Operating Environment	Temp : 0 ~ 40 deg Humidity : ~ 80 %		
10	Storage Environment	Temp : -20 ~ 60 deg Humidity : -85 %		

## 5. Chrominance & Luminance(Edge LED models)

No.	Item		Min	Typ	Max	Unit		Remarks	
1	White brightness (10% decline of Module spec) (20% decline of Module spec': only 47LV3500)		288	360		cd/m <sup>2</sup>	AUO	32LV3500-UA / 32LV3520-UC	
			288	360			AUO	37LV3500-UA	
			270	360			CMI	42LV3500-UA / 42LV3520-UC	
			288	360			AUO	42LV3500-UA / 42LV3520-UC	
			232	288			LGD	47LV3500-UA	
			288	360			LGD	55LV3500-UA	
			324	415			AUO	55LV3500-UA	
			261	324			LGD	37LV3500-UA	
			324	415			CMI	32LV3500-UA / 32LV3520-UC	
			250	315			AUO	32LV2500-UA	
			270	342			LGD	32LV2500-UA	
			261	324			LGD	32LV3500-UA / 32LV3520-UC	
			261	324			LGD	42LV3500-UA / 42LV3520-UC	
2	Luminance uniformity		75			%			
3	Color coordinate (Default)	RED	X	Typ. -0.03	0.630	Typ. +0.03		32LV3500-UA (AUO)	
			Y		0.330			32LV3520-UC (AUO)	
		GREEN	X		0.320				
			Y		0.620				
		BLUE	X		0.150				
			Y		0.040				
		WHITE	X		0.280				
			Y		0.290				
		RED	X	Typ. -0.03	0.640	Typ. +0.03		37LV3500-UA (AUO)	
			Y		0.330				
		GREEN	X		0.320				
			Y		0.620				
		BLUE	X		0.150				
			Y		0.050				
		WHITE	X		0.280				
			Y		0.290				
		RED	X	Typ. -0.03	0.644	Typ. +0.03		42LV3500-UA (CMI)	
			Y		0.331				
		GREEN	X		0.295				
			Y		0.617				
		BLUE	X		0.148				
			Y		0.053				
		WHITE	X		0.280				
			Y		0.290				
		RED	X	Typ. -0.03	0.630	Typ. +0.03		42LV3500-UA (AUO)	
			Y		0.330			42LV3520-UC (AUO)	
		GREEN	X		0.320				
			Y		0.620				
		BLUE	X		0.150				
			Y		0.040				
		WHITE	X		0.280				
			Y		0.290				

No.	Item		Min	Typ	Max	Unit		Remarks			
	RED	X	Typ. -0.03	0.648	Typ. +0.03			47LV3500-UA (LGD)			
		Y		0.333							
	GREEN	X		0.308							
		Y		0.600							
	BLUE	X		0.149							
		Y		0.059							
	WHITE	X		0.279							
		Y		0.292							
	RED	X	Typ. -0.03	0.649				55LV3500-UA (LGD)			
		Y		0.332							
	GREEN	X		0.307							
		Y		0.595							
	BLUE	X		0.149							
		Y		0.059							
	WHITE	X		0.279							
		Y		0.292							
	RED	X	Typ. -0.03	0.640				55LV3500-UA (AUO)			
		Y		0.330							
	GREEN	X		0.300							
		Y		0.620							
	BLUE	X		0.150							
		Y		0.050							
	WHITE	X		0.280							
		Y		0.290							
	RED	X	Typ. -0.03	0.637				37LV3500-UA (LGD)			
		Y		0.341							
	GREEN	X		0.319							
		Y		0.605							
	BLUE	X		0.154							
		Y		0.051							
	WHITE	X		0.279							
		Y		0.292							
	RED	X	Typ. -0.03	0.637				32LV3500-UA (LGD) 32LV3520-UC (LGD)			
		Y		0.341							
	GREEN	X		0.320							
		Y		0.606							
	BLUE	X		0.152							
		Y		0.055							
	WHITE	X		0.279							
		Y		0.292							
	RED	X	Typ. -0.03	0.637				42LV3500-UA (LGD) 42LV3520-UC (LGD)			
		Y		0.341							
	GREEN	X		0.325							
		Y		0.600							
	BLUE	X		0.152							
		Y		0.051							
	WHITE	X		0.279							
		Y		0.292							

No.	Item			Min	Typ	Max	Unit		Remarks		
	RED	X		Typ. -0.03	0.635	Typ. +0.03		32LV3500-UA (CMI)			
		Y			0.323						
		X			0.288						
		Y			0.600						
		X		Typ. -0.03	0.148	Typ. +0.03					
		Y			0.050						
	GREEN	X		Typ. -0.03	0.280	Typ. +0.03	32LV2500-UA (LGD)	32LV2500-UA (LGD)			
		Y			0.290						
	BLUE	X		Typ. -0.03	TBD	Typ. +0.03					
		Y			TBD						
		X		Typ. -0.03	TBD	Typ. +0.03					
		Y			TBD						
	WHITE	X		Typ. -0.03	0.279	Typ. +0.03					
		Y			0.292						
	RED	X		Typ. -0.03	0.640	Typ. +0.03	32LV2500-UA (AUO)	32LV2500-UA (AUO)			
		Y			0.330						
		X		Typ. -0.03	0.310	Typ. +0.03					
		Y			0.620						
		X		Typ. -0.03	0.150	Typ. +0.03					
		Y			0.060						
	GREEN	X		Typ. -0.03	0.280	Typ. +0.03					
		Y			0.290						
4	Color coordinate uniformity								N/A		
5	Contrast ratio (Module)			3200	4000			32/37/42LV3500(20)-UA(C) (AUO)			
				4200	6000			42LV3500-UA (CMI)			
				1100	1600			55LV3500-UA (LGD)			
				2400	3000			32LV2500-UA (AUO)			
				3750	5000			32LV2500-UA (CMI)			
				1000	1400			47LV3500-UA (LGD)			
				3200	4000			55LV3500-UA (AUO)			
				1100	1600			37LV3500-UA (LGD)			
				2400	3000			32LV3500-UA (AUO)			
				1000	1400			32LV3500(20)-UA(C) (LGD)			
	Contrast ratio (DCR)			2,000,000:1		3,000,000:1	All	Global Dimming (Normal Dimming )			
				800,000:1		1,000,000:1	Only	32LV2500			
6	Color Temperature	COOL		0.254	0.269	0.284	13000K	** The W/B Tolerance is ±0.015 for picture quality by DQA.			
		MEDIUM		0.258	0.273	0.288		9300K			
		WARM		0.270	0.285	0.300		6500K			
7	Response time			0.278	0.293	0.308					
				0.298	0.313	0.324					
				0.314	0.329	0.344					
7				3	6.5		ms	Only	55LV3500		
					6	9			32LV2500		
									N/A		
									AUO		
									LGD		

## 6. Component Video Input (Y, C<sub>B</sub>/P<sub>B</sub>, C<sub>R</sub>/P<sub>R</sub>)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed
1.	720*480	15.73	60	13.5135	SDTV ,DVD 480I
2.	720*480	15.73	59.94	13.5	SDTV ,DVD 480I
3.	720*480	31.50	60	27.027	SDTV 480P
4.	720*480	31.47	59.94	27.0	SDTV 480P
5.	1280*720	45.00	60.00	74.25	HDTV 720P
6.	1280*720	44.96	59.94	74.176	HDTV 720P
7.	1920*1080	33.75	60.00	74.25	HDTV 1080I
8.	1920*1080	33.72	59.94	74.176	HDTV 1080I
9.	1920*1080	67.500	60	148.50	HDTV 1080P
10.	1920*1080	67.432	59.94	148.352	HDTV 1080P
11.	1920*1080	27.000	24.000	74.25	HDTV 1080P
12.	1920*1080	26.97	23.976	74.176	HDTV 1080P
13.	1920*1080	33.75	30.000	74.25	HDTV 1080P
14.	1920*1080	33.71	29.97	740176	HDTV 1080P

## 7. RGB Input (PC)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed	
					DDC	
1.	640*350	31.468	70.09	25.17	EGA	X
2.	720*400	31.469	70.08	28.32	DOS	O
3.	640*480	31.469	59.94	25.17	VESA(VGA)	O
4.	800*600	37.879	60.31	40.00	VESA(SVGA)	O
5.	1024*768	48.363	60.00	65.00	VESA(XGA)	O
6.	1280*768	47.776	59.870	79.5	CVT(WXGA)	X
7.	1360*768	47.712	60.015	85.50	VESA(WXGA)	X
8.	1280*1024	63.981	60.020	108.00	Except LV2500	VESA(SXGA)
9.	1600*1200	75.00	60.00	162	Except LV2500	VESA (UXGA)
10.	1920*1080	66.587	59.934	148.5	Except LV2500	HDTV 1080P

## 8. HDMI input (PC/DTV)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed	
					DDC	
	PC					
1.	640*350	31.468	70.09	25.17	EGA	X
2.	720*400	31.469	70.08	28.32	DOS	O
3.	640*480	31.469	59.94	25.17	VESA(VGA)	X
4.	800*600	37.879	60.31	40.00	VESA(SVGA)	O
5.	1024*768	48.363	60.00	65.00	VESA(XGA)	O
6.	1280*768	47.776	59.870	79.5	CVT(WXGA)	X
7.	1360*768	47.712	60.015	85.50	VESA (WXGA)	O
8.	1280*1024	63.981	60.020	108.00	Except LV2500	VESA (SXGA)
9.	1600*1200	75.00	60.00	162	Except LV2500	VESA (UXGA)
10.	1920*1080	67.500	60.000	148.50	Except LV2500	HDTV 1080P
	DTV					
1	720*480	31.47	60	27.027	SDTV 480P	O
2	720*480	31.47	59.94	27.00	SDTV 480P	O
3	1280*720	45.00	60.00	74.25	HDTV 720P	O
4	1280*720	44.96	59.94	74.176	HDTV 720P	O
5	1920*1080	33.75	60.00	74.25	HDTV 1080I	O
6	1920*1080	33.72	59.94	74.176	HDTV 1080I	O
7	1920*1080	67.500	60	148.50	HDTV 1080P	O
8	1920*1080	67.432	59.939	148.352	HDTV 1080P	O
9	1920*1080	27.000	24.000	74.25	HDTV 1080P	O
10	1920*1080	26.97	23.976	74.176	HDTV 1080P	O
11	1920*1080	33.75	30.000	74.25	HDTV 1080P	O
12	1920*1080	33.71	29.97	74.176	HDTV 1080P	O

# ADJUSTMENT INSTRUCTION

## 1. Application range

This spec. sheet applies to LA01U / LA01T / LA01S Chassis applied LED LCD TV all models manufactured in TV factory.

## 2. Specification

- 2.1 Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
- 2.2 Adjustment must be done in the correct order.
- 2.3 The adjustment must be performed in the circumstance of  $25\pm5^{\circ}\text{C}$  of temperature and  $65\pm10\%$  of relative humidity
- 2.4 The input voltage of the receiver must keep  $100\sim240V\sim$ ,  $50/60\text{Hz}$ .
- 2.5 At first Worker must turn on the SET by using Power Only key.
- 2.5 The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15.

In case of keeping module is in the circumstance of  $0^{\circ}\text{C}$ , it should be placed in the circumstance of above  $15^{\circ}\text{C}$  for 2 hours

In case of keeping module is in the circumstance of below  $-20^{\circ}\text{C}$ , it should be placed in the circumstance of above  $15^{\circ}\text{C}$  for 3 hours.

- Caution

When a still image is displayed for 20 minutes or longer (especially where W/B scale is strong. Digital pattern 13ch and/or Cross hatch pattern 09ch), there can some afterimage in the black level area.

## 3. Adjustment items

### 3.1 Board Level Adjustment

- (1) ADC adjustment: Component 480i, 1080p / RGB-PC 1080p
- (2) EDID downloads for HDMI and RGB-PC

- Remark

- Above adjustment items can be also performed in Final Assembly if needed. Adjustment items in both PCBA and final assembly stages can be checked by using the INSTANT Menu 1.ADJUST CHECK.

### 3.2 Final Assembly adjustment

- (1) White Balance adjustment
- (2) RS-232C functionality check
- (3) Factory Option setting per destination
- (4) Shipment mode setting (IN-STOP)

### 3.3 Etc

- (1) Ship-out mode
- (2) Service Option Default
- (3) USB Download(S/W Update, Option, Service only)
- (4) ISP Download (Optional)

## 4. Board Level Adjustment

### 4.1. ADC Adjustment

#### 4.1.1. Overview

- ADC adjustment is needed to find the optimum black level and gain in Analog-to-Digital device and to compensate RGB deviation.

#### 4.1.2. Equipment & Condition

- 1) Jig (RS-232C protocol)

- 2) Inner Pattern

- Resolution : 1080p (Inner Pattern)
- Resolution : 1024\*768 RGB (Inner Pattern)
- Pattern : Horizontal 100% Color Bar Pattern
- Pattern level :  $0.7\pm0.1 \text{ Vp-p}$

#### 4.1.3. Adjustment

##### 4.1.3.1 Adjustment method

- Using RS-232, adjust items listed in 3.1 in the order shown in "4.1.3.3"

##### 4.1.3.2 Adj. protocol

Protocol	Command	SetACK
Enter adj. mode	aa 00 00	a 00 OK00x
Source change	xb 00 40 xb 00 60	b 00 OK40x (Adjust 480i/1080p Comp1) b 00 OK60x (Adjust 1920*1080 RGB)
Begin adj.	ad 00 10	
Return adj. result		OKx (Case of Success) NGx (Case of Fail)
Read adj. data	(main) ad 00 20  (sub) ad 00 21	(main) 000000000000000000000000000000007c007b006dx  (Sub) 000000700000000000000000000000007c00830077x
Confirm adj.	ad 00 99	NG 03 00x (Fail) NG 03 01x (Fail) NG 03 02x (Fail) OK 03 03x (Success)
End adj.	aa 00 90	a 00 OK90x

Ref.) ADC Adj. RS232C Protocol\_Ver1.0

#### 4.1.3.3. Adj. order

- aa 00 00 [Enter ADC adj. mode]
- xb 00 40 [Change input source to Component1(1080i)]
- ad 00 10 [Adjust 480i Comp1]
- xb 00 60 [Change input source to RGB(1024\*768)]
- ad 00 10 [Adjust 1024\*768 RGB]
- ad 00 90 End adj.

Ref.) ADC adj. RS232C Protocol\_Ver1.0

## 4.2. EDID/DDC Download

### 4.2.1 Overview

- It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of "Plug and Play".

### 4.2.2 Equipment

- Since embedded EDID data is used, EDID download JIG, HDMI cable and D-sub cable are not need.
- Adjust remocon.

### 4.2.3 Download method

- 1) Press Adj. key on the Adj. R/C,
- 2) Select EDID D/L menu.
- 3) By pressing Enter key, EDID download will begin
- 4) If Download is successful, OK is display, but If Download is failure, NG is displayed.
- 5) If Download is failure, Re-try downloads.

\* Caution) When EDID Download, must remove RGB/HDMI Cable.

### 4.2.4 EDID DATA

- 1) North America

# HDMI1-EDID (C/S : 03CC)  
EDID Block 0

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0		00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10		01	15	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20		0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30		01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C	
40		45	00	A0	5A	00	00	00	1E	01	1D	00	72	51	D0	1E	20
50		6E	28	55	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
60		3F	1F	52	10	00	0A	20	20	20	20	20	00	00	00	FC	
70		00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	03

### Block1

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0		02	03	1C	F1	47	10	22	20	05	84	03	02	23	09	07	07
10		67	03	0C	00	10	00	B8	2D	E3	05	03	01	02	3A	80	18
20		71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01	1D
30		80	18	71	1C	16	20	58	2C	25	00	A0	5A	00	00	00	9E
40		01	1D	00	72	51	D0	1E	20	6E	28	55	00	A0	5A	00	00
50		00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	A0	5A
60		00	00	00	18	26	36	80	A0	70	38	1F	40	30	20	25	00
70		A0	5A	00	00	00	1A	00	00	00	00	00	00	00	00	00	CC

# HDMI2-EDID (C/S : 03BC)  
Block0

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0		00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10		01	15	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20		0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30		01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C	
40		45	00	A0	5A	00	00	00	1E	01	1D	00	72	51	D0	1E	20
50		6E	28	55	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
60		3F	1F	52	10	00	0A	20	20	20	20	20	00	00	00	FC	
70		00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	03

### Block1

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0		02	03	1C	F1	47	10	22	20	05	84	03	02	23	09	07	07
10		67	03	0C	00	20	00	B8	2D	E3	05	03	01	02	3A	80	18
20		71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01	1D
30		80	18	71	1C	16	20	58	2C	25	00	A0	5A	00	00	00	9E
40		01	1D	00	72	51	D0	1E	20	6E	28	55	00	A0	5A	00	00
50		00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	A0	5A
60		00	00	00	18	26	36	80	A0	70	38	1F	40	30	20	25	00
70		A0	5A	00	00	00	1A	00	00	00	00	00	00	00	00	00	BC

# HDMI3-EDID (C/S : 03AC)

### Block0

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0		00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10		01	15	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20		0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30		01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C	
40		45	00	A0	5A	00	00	00	1E	01	1D	00	72	51	D0	1E	20
50		6E	28	55	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
60		3F	1F	52	10	00	0A	20	20	20	20	20	00	00	00	FC	
70		00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	03

### Block1

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0		02	03	1C	F1	47	10	22	20	05	84	03	02	23	09	07	07
10		67	03	0C	00	30	00	B8	2D	E3	05	03	01	02	3A	80	18
20		71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01	1D
30		80	18	71	1C	16	20	58	2C	25	00	A0	5A	00	00	00	9E
40		01	1D	00	72	51	D0	1E	20	6E	28	55	00	A0	5A	00	00
50		00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	A0	5A
60		00	00	00	18	26	36	80	A0	70	38	1F	40	30	20	25	00
70		A0	5A	00	00	00	1A	00	00	00	00	00	00	00	00	00	AC

# RGB-EDID (C/S : 1C)

### Block0

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0		00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10		01	15	01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26
20		0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30		01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C	
40		45	00	A0	5A	00	00	00	1E	01	1D	00	72	51	D0	1E	20
50		6E	28	55	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60		3E	1E	53	10	00	0A	20	20	20	20	20	00	00	00	FC	
70		00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	00	1C

## 5. Final Assembly Adjustment

### 5.1. White Balance Adjustment

#### 5.1.1. Overview

##### 5.1.1.1. W/B adj. Objective & How-it-works

(1) Objective: To reduce each Panel's W/B deviation  
 (2) How-it-works: When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.

(3) Adj. condition: normal temperature

1) Surrounding Temperature:  $25 \pm 5^\circ\text{C}$

2) Warm-up time: About 5 Min

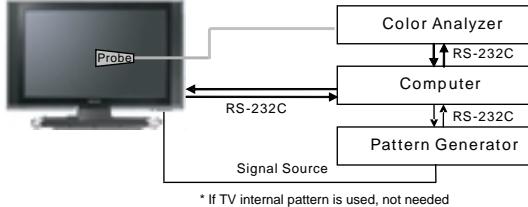
3) Surrounding Humidity: 20% ~ 80%

#### 5.1.2. Equipment

- (1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)
- (2) Adj. Computer (During auto adj., RS-232C protocol is needed)
- (3) Adjust Remocon
- (4) Video Signal Generator MSPG-925F 720p/204-Gray (Model: 217, Pattern: 49)

• Color Analyzer Matrix should be calibrated using CS-1000

#### 5.1.3. Equipment connection



Connection Diagram of Automatic Adjustment

#### 5.1.4. Adjustment Command (Protocol)

##### (1) RS-232C Command used during auto-adj.

RS-232C COMMAND [CMD ID DATA]			Explanation
Wb	00	00	Begin White Balance adj.
Wb	00	ff	End White Balance adj. (internal pattern disappears )

Ex) wb 00 00 -> Begin white balance auto-adj.

wb 00 10 -> Gain adj.

ja 00 ff -> Adj. data

jb 00 c0

...

...

wb 00 1f -> Gain adj. complete

\*(wb 00 20(start), wb 00 2f(end)) -> Off-set adj.

wb 00 ff ->End white balance auto adj.

#### (2) Adj. Map

Applied Model :

32/37/42/47/55LV3500-UA , 32/26/22/19LV2500-UA , 32/42/47LV3500-NA, 42/47LV4500-NA, 42/47/55LW4500-NA

Adj.	item	Command (lower case ASCII)	Data Range (Hex.)		Default (Decimal)
		CMD1	CMD2	MIN	MAX
Cool	R Gain	j	g	00	C0
	G Gain	j	h	00	C0
	B Gain	j	i	00	C0
	R Cut				64
	G Cut				64
	B Cut				64
Medium	R Gain	j	a	00	C0
	G Gain	j	b	00	C0
	B Gain	j	c	00	C0
	R Cut				64
	G Cut				64
	B Cut				64
Warm	R Gain	j	d	00	C0
	G Gain	j	e	00	C0
	B Gain	j	f	00	C0
	R Cut				64
	G Cut				64
	B Cut				64

#### 5.1.5. Adjustment method

##### 5.1.5.1 Auto WB calibration

- 1) Set TV in adj. mode using POWER ONLY (P-ONLY) key
- 2) Zero calibrate probe then place it on the center of the Display
- 3) Connect Cable(RS-232C)
- 4) Select mode in adj. Program and begin adj.
- 5) When adj. is complete (OK Sing), check adj. status pre mode (Cool, Medium, Warm)
- 6) Remove probe and RS-232C cable to complete adj.

- W/B Adj. must begin as start command "wb 00 00" , and finish as end command "wb 00 ff", and Adj. offset if need

##### 5.1.5.2 Manual adj. method

- 1) Set TV in Adj. mode using POWER ON
- 2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface..
- 3) Press ADJ key -> EZ adjust using adj. R/C 6. White-Balance then press the cursor to the right (KEYG). (When KEY(G) is pressed 204 Gray(80IRE) internal pattern will be displayed)
- 4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
- 5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

- If internal pattern is not available, use RF input. In EZ Adj. menu 6.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 204 Gray pattern.

- Adj. condition and cautionary items

#### 1) Lighting condition in surrounding area

Surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.

#### 2) Probe location : Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~100°)

#### 3) Aging time

- After Aging Start, Keep the Power ON status during 5 Minutes.
- In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

#### 5.1.6 Reference (White Balance Adj. coordinate and color temperature)

##### (1) Luminance: 204 Gray, 80IRE

##### (2) Standard color coordinate and temperature using CS-1000 (over 26 inch)

Mode	Color Coordination		Temp	$\Delta U/V$
	x	y		
COOL	0.269	0.273	13000K	0.0000
MEDIUM	0.285	0.293	9300K	0.0000
WARM	0.313	0.329	6500K	0.0000

- Standard color coordinate and temperature using CA-210(CH 9)

Mode	Color Coordination		Temp	$\Delta U/V$
	x	y		
COOL	0.269±0.002	0.273±0.002	13000K	0.0000
MEDIUM	0.285±0.002	0.293±0.002	9300K	0.0000
WARM	0.313±0.002	0.329±0.002	6500K	0.0000

- Standard color coordinate and temperature using CA-210(CH 14) – by aging time

Edge LED models (applied only LGD Module)

GP2G	Aging time (Min)	Cool		Medium		Warm	
		x	y	x	y	x	y
		269	273	285	293	313	329
1	0-2	276	285	292	305	315	334
2	3-5	274	282	290	302	313	332
3	6-9	273	280	289	300	312	330
4	10-19	272	278	288	298	311	328
5	20-35	271	276	287	296	310	326
6	36-49	269	274	286	294	309	324
7	50-79	269	273	286	293	308	323
8	Over 80	269	273	285	293	308	323

## 5.2 HDCP (High-Bandwidth Digital Contents Protection) SETTING

## 5.3 Option selection per country

### 5.3.1 Overview

- Option selection is only done for models in Non-USA North America due to rating
- Applied model: LA01U Chassis applied None USA model(CANADA, MEXICO)

### 5.3.2 Method

- (1) Press ADJ key on the Adj. R/C, and then select Country Group Menu
- (2) Depending on destination, select KR or US, then on the lower Country option, select US, CA, MX. Selection is done using +, - KEY

## 5.4 Tool Option selection

- Method: Press Adj. key on the Adj. R/C, then select Tool option.

Model	Tool 1	Tool 2	Tool 3	Tool 4	Tool 5	Menu
32LV3500(20)-UA(B)	18280	19478	55337	2844	16738	AUO
37LV3500-UA	22376	19478	55338	2844	16738	AUO
42LV3500(20)-UA(B)	26472	19478	55338	2844	16736	AUO
42LV3500-UA	26468	19478	55337	2844	16425	CMI
47LV3500-UA	34656	19478	55337	2844	16640	LGD
55LV3500-UA	46944	19478	55338	2844	24832	LGD
32LV2500-UA	18213	18954	55332	2829	16425	CMI
32LV2500-UA	18216	19478	55337	2844	16738	AUO
42LV4500-NA	26406	19478	55337	2840	24576	LGD
47LV4500-NA	34688	19478	55337	2840	24576	LGD
42LW4500-NA	26528	19478	55337	2968	8192	LGD
47LW4500-NA	34720	19478	55337	2968	8192	LGD
55LW4500-NA	47008	19478	55337	2968	8192	LGD
47LV3500(1,20)-NA(B,C)	34656	19478	55337	2840	16384	LGD
42LV3500(1,20)-NA(B,C)	26464	19478	55337	2840	16416	LGD
32LV3500-NA	18272	19478	55337	2840	16418	LGD
26LV2500-NA	14120	18954	55338	2844	16640	AUO
22LV2500(20)-UA(C)	10024	18954	55337	2844	16640	AUO
19LV2500(20)-UA(C)	5928	18954	55337	2844	16640	AUO
37LV3500-UA	22368	19478	55337	2844	16674	LGD
55LV3500(1,20)-NA(B,C)	46944	19478	55337	2840	24576	LGD
32LV3500(20)-UA(B)	18272	19478	55339	2844	16418	LGD
42LV3500(20)-UA(B)	26464	19478	55339	2844	16672	LGD
32LV3500(1,20)-NA(B,C)	18288	19478	55337	2840	16416	IPS-A
42LV3400-NA	26592	9226	53289	2840	16416	LGD
32LV3400-NA	18400	9226	53289	2332	16418	LGD
32LV2500-UA	18208	19478	55337	2844	16674	LGD
26LV2500(20)-UA(C)	14112	18954	55337	2844	16640	LGD

## 6. GND and Hi-pot Test

### 6.1. Method

#### 6.1.1. GND & HI-POT auto-check preparation

- (1) Check the POWER CABLE and SIGNAL CABLE insertion condition

#### 6.1.2. GND & HI-POT auto-check

- (1) Pallet moves in the station. (POWER CORD / AV CORD is tightly inserted)
- (2) Connect the AV JACK Tester.
- (3) Controller (GWS103-4) on.
- (4) GND Test (Auto)
  - If Test is failed, Buzzer operates.
  - If Test is passed, execute next process (Hi-pot test).  
(Remove A/V CORD from A/V JACK BOX)
- (5) HI-POT test (Auto)
  - If Test is failed, Buzzer operates.
  - If Test is passed, GOOD Lamp on and move to next process automatically.

### 6.2. Checkpoint

- TEST voltage

- GND: 1.5KV/min at 100mA
  - SIGNAL: 3KV/min at 100mA

- TEST time: 1 second

- TEST POINT

- GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND

- Internal Pressure TEST = POWER CORD GND & LIVE & NEUTRAL

- LEAKAGE CURRENT: At 0.5mAms

## 7. EYE-Q Check

Step 1) Turn on the TV.

Step 2) Press EYE button in adjust remote control.

Step 3) Stay 6 seconds with Eye Q sensor hidden located on the front of the set.

Step 4) Check the "Sensor Data" on the screen and check whether the value is lower than after 6 seconds, the value does not go below 10, Eye Q sensor is not working properly. Then, change the sensor.

Step 5) Remove hand from the Eye Q II sensor and stay for 6 seconds.

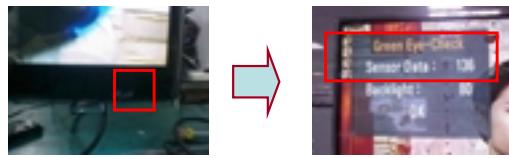
Step 6) Check whether the "Back Light (xxx)" value has risen on the screen. If after 6 seconds and the value still does not go high, the eye Q II sensor is not working properly. Replace the sensor.



<Step1>

<Step2>

<Step3>

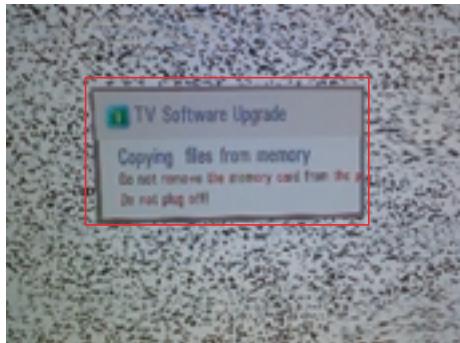


<Step4>

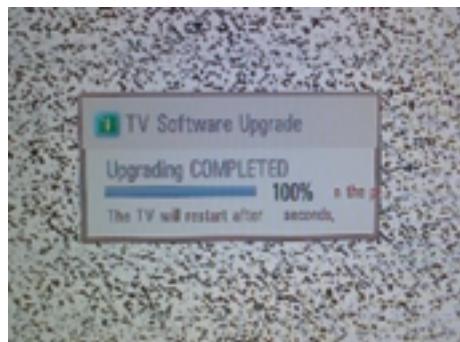
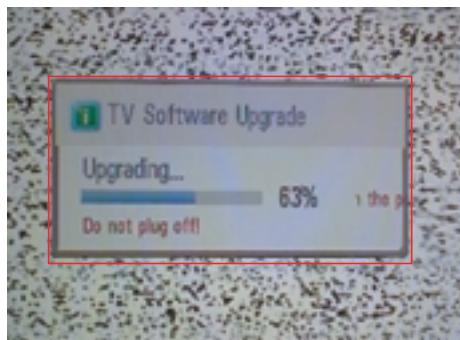
<Step5>

## 8. USB S/W Download (Option, Service only)

1. Put the USB Stick to the USB socket
2. Automatically detecting update file in USB Stick
- If your downloaded program version in USB Stick is Low, it didn't work. But your downloaded version is High, USB data is automatically detecting
3. Show the message "Copying files from memory"



4. Updating is starting.



5. Updating Completed, The TV will restart automatically
6. If your TV is turned on, check your updated version and Tool option. (Explain the Tool option, next stage)

\* If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

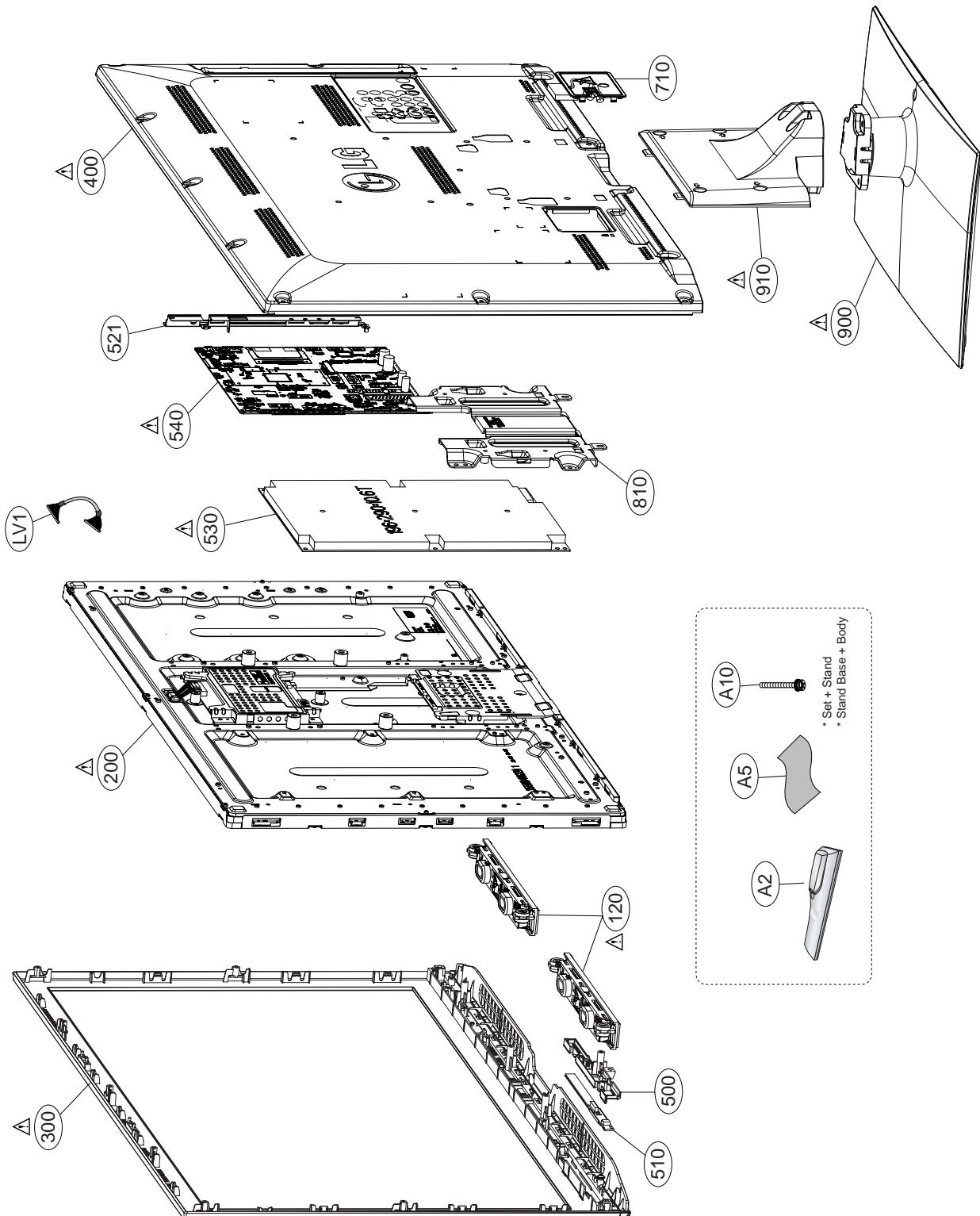
**\* After downloading, have to adjust TOOL OPTION again.**

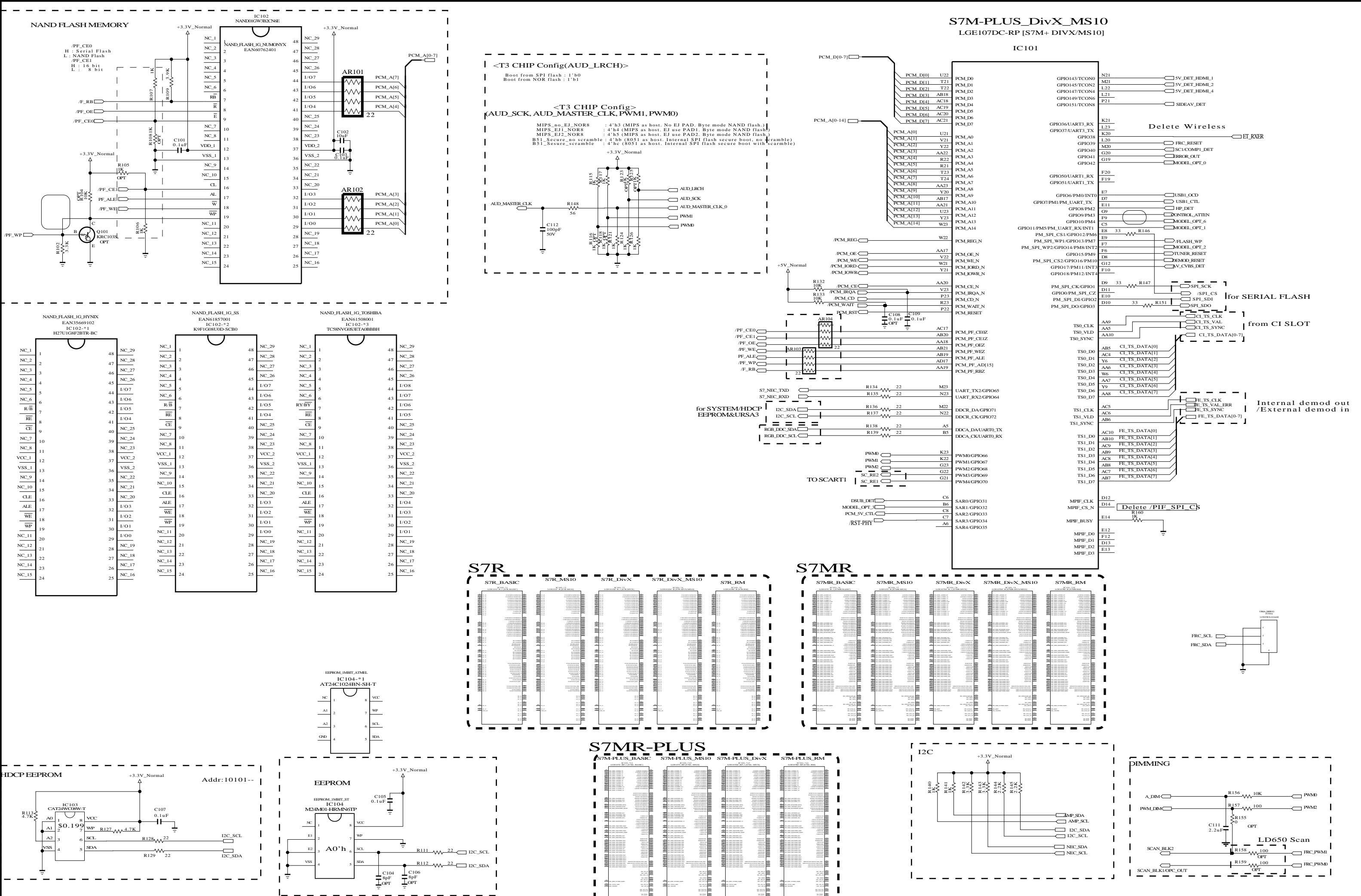
1. Push "IN-START" key in service remote controller.
2. Select "Tool Option 1" and Push "OK" button.
3. Punch in the number. (Each model has their number.)

# EXPLODED VIEW

## IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by  in the Schematic Diagram and EXPLODED VIEW.  
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards.  
Do not modify the original design without permission of manufacturer.



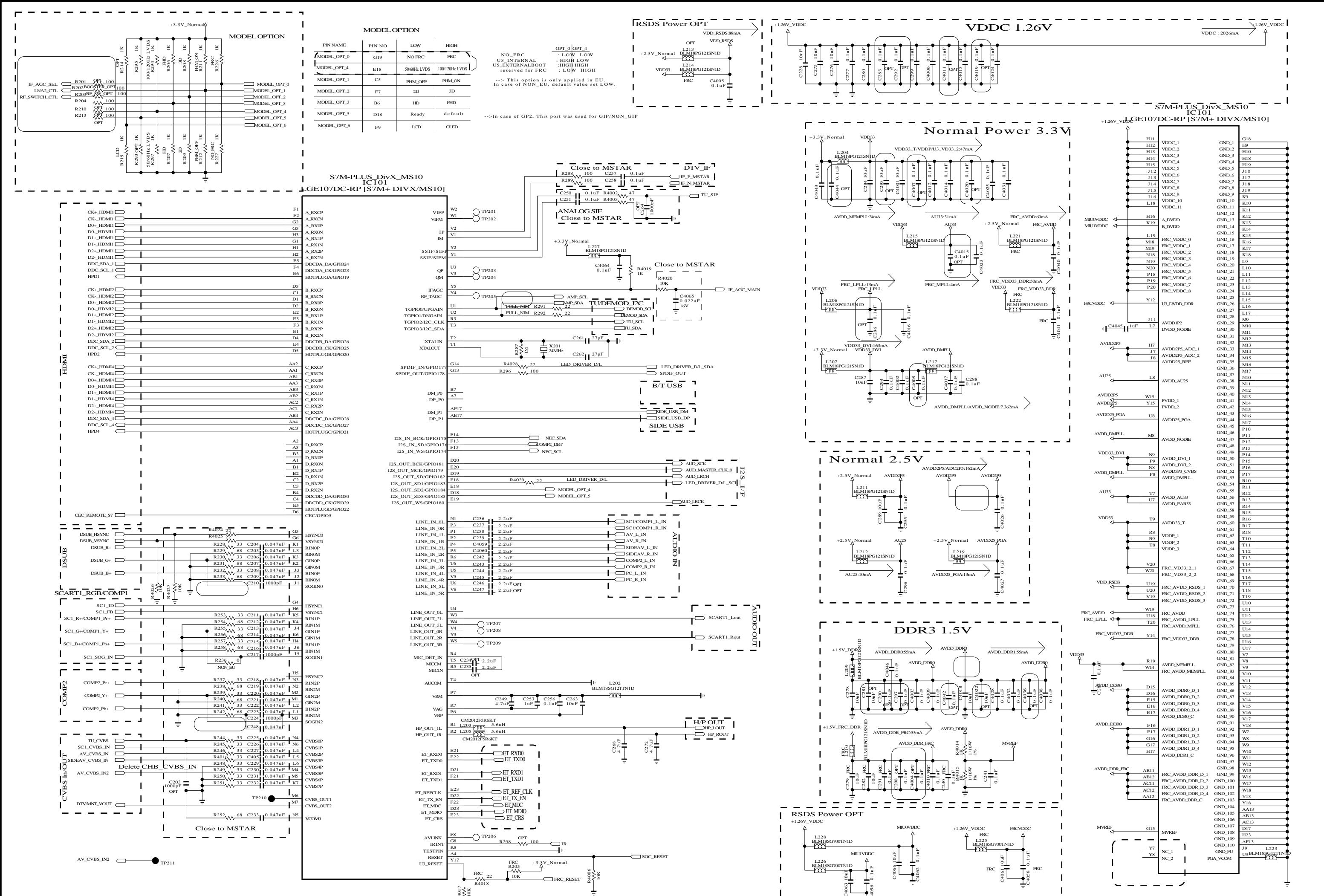


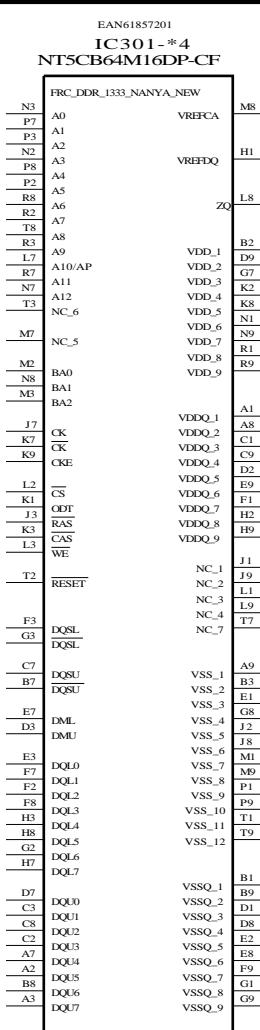
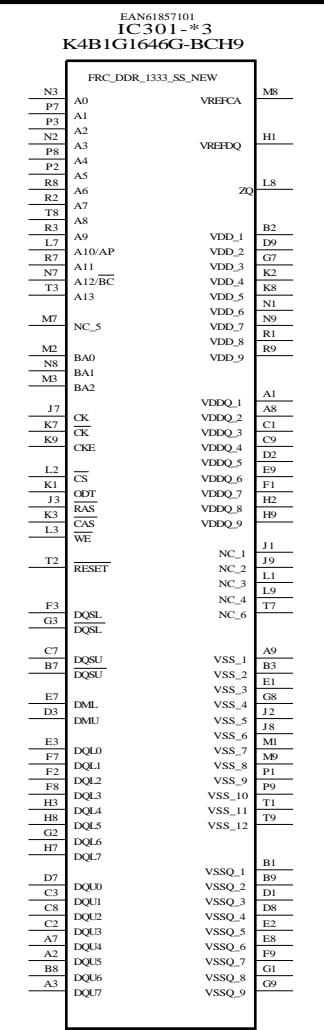
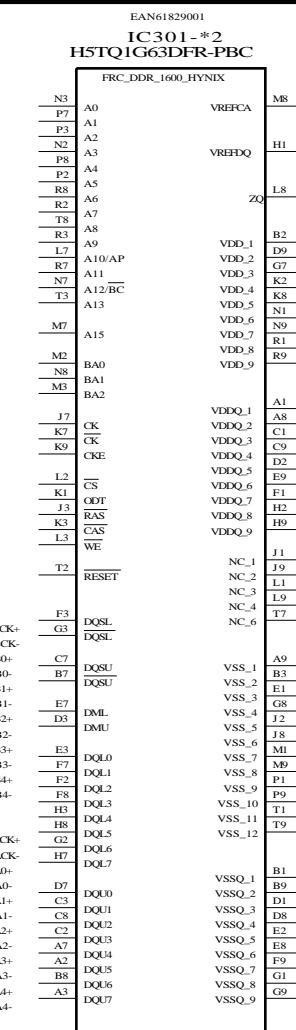
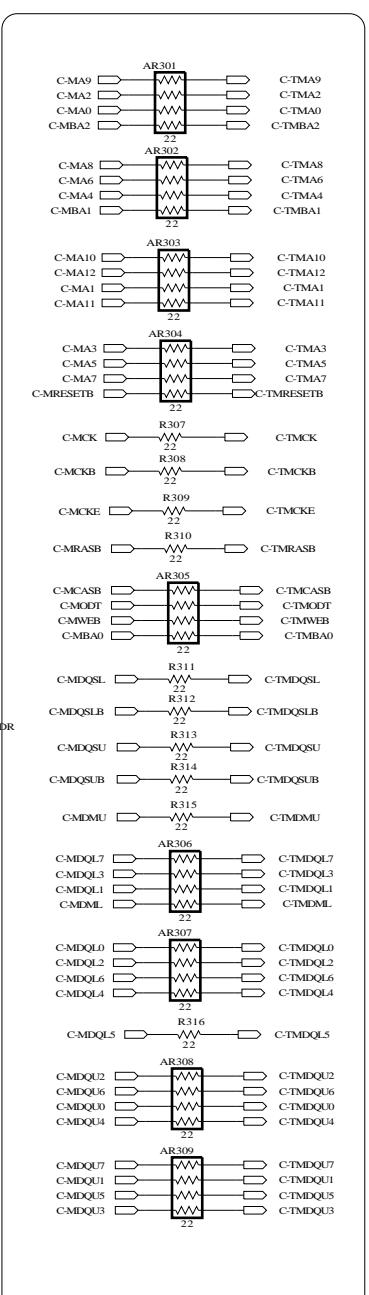
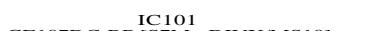
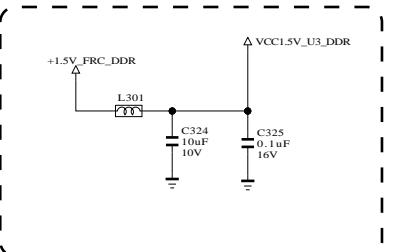
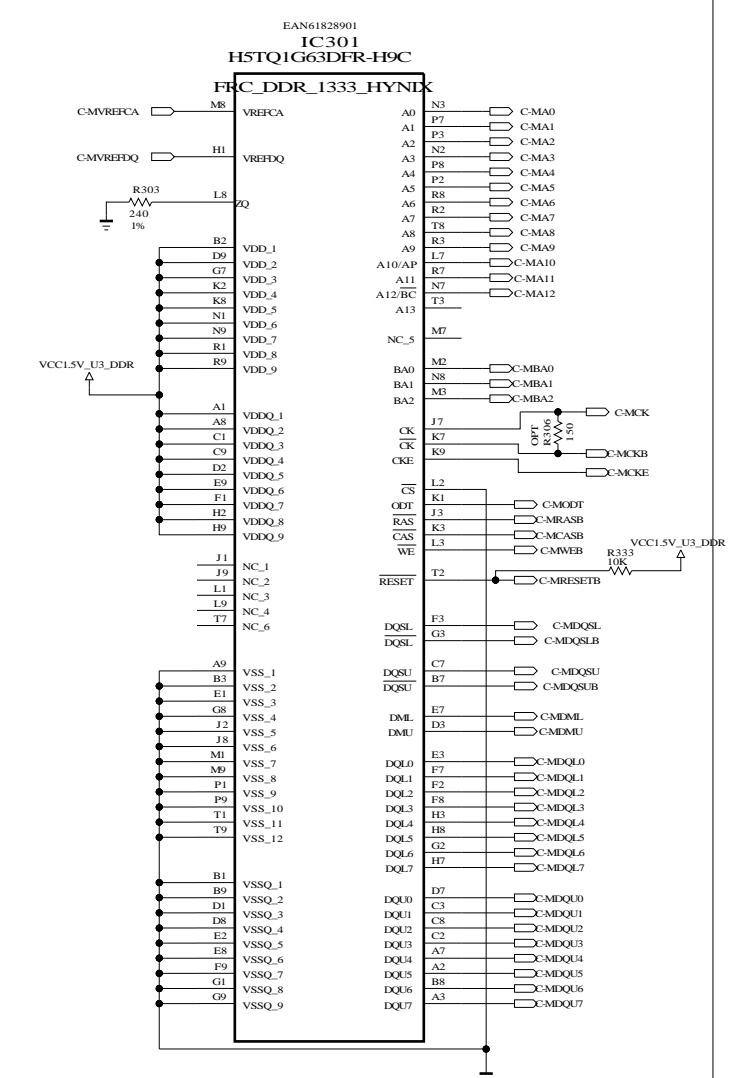
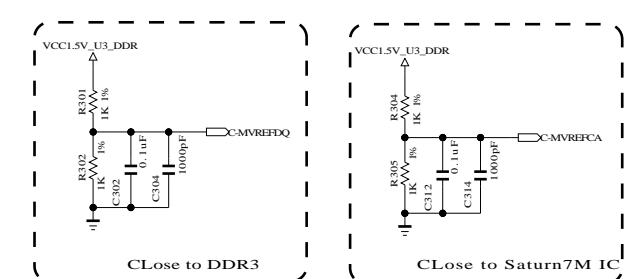
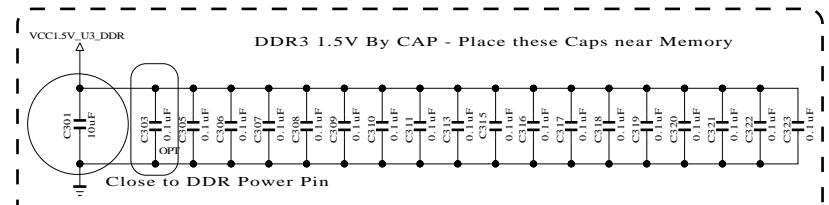
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

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MODEL BLOCK	GP3_Saturn7M	DATE SHEET	Ver. O.1
	FLASH/EEPROM/GPIO		1





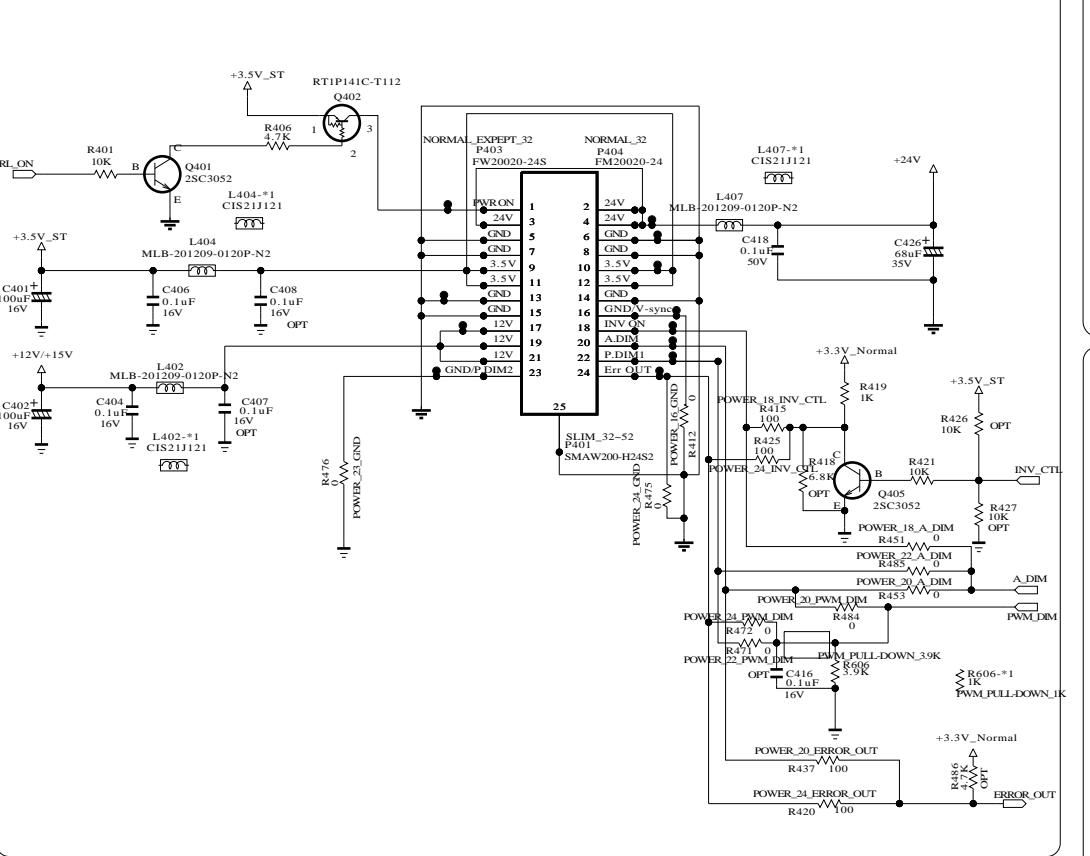
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SECRET



MODEL	GP2R	DATE	20101023
WORK	FRC_DDR	SHEET	3 /

# FROM LIPS & POWER B/D



<MODULE PIN MAP>

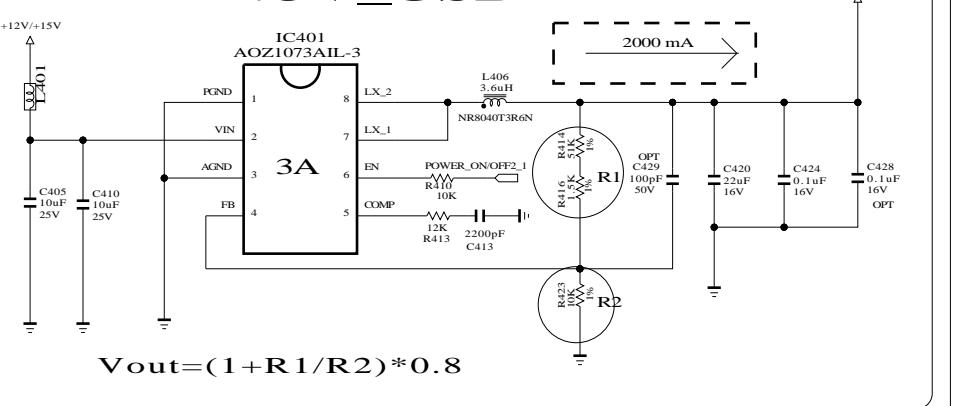
PIN No	LGD(PSU) or LIPS (PSU)	CMO10Lamp (PSU)	AUO 10Lamp (PSU)	SHARP (PSU)	IPS-@ (PSU)
16	GND	GND	GND	GND	GND
18	INV_ON	A-DIM	INV_ON	INV_ON	INV_ON
20	VBR-A	NC	Err_out	S2/60:ERROR 2/32HD:NC	Err_out
22	PWM_DIM	PWM_DIM	NC	2/32/52:PWM 60:NC	NC
24	Err_out	INV_ON	PWM_DIM	2/32/52:GND 60:PWM	PWM_DIM
23	GND	GND	GND	GND	GND

<LED MODULE PIN MAP -> latest update 20100618>

PIN No	LGD LPB / 32LE5300-TA CM010LED (PSU)	32LE4500-TA AUO 10LED (PSU)	32LE300-TA LGD 10LED (PSU)
16	NC	NC	NC
18	INV_ON	INV_ON	INV_ON
20	NC	err_out	err_out
22	PWM_DIM	NC	NC
24	err_out	PWM_DIM	PWM_DIM
23	NC	NC	NC

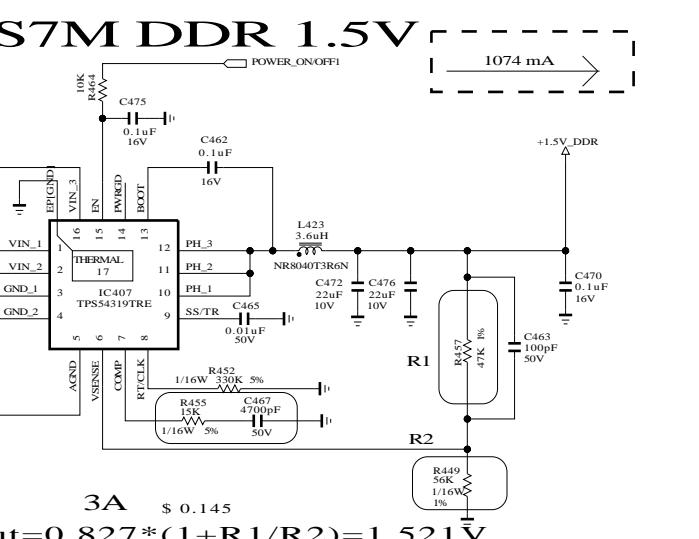
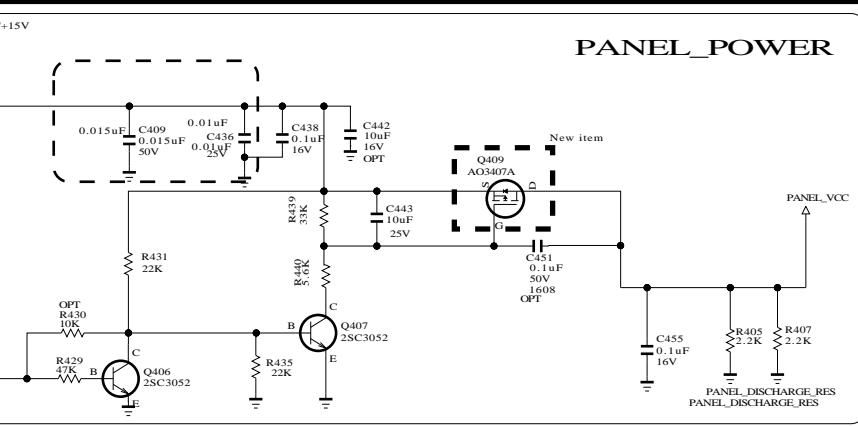
LGD edge led error-out use or not? checking is necessary...

+5V\_USB



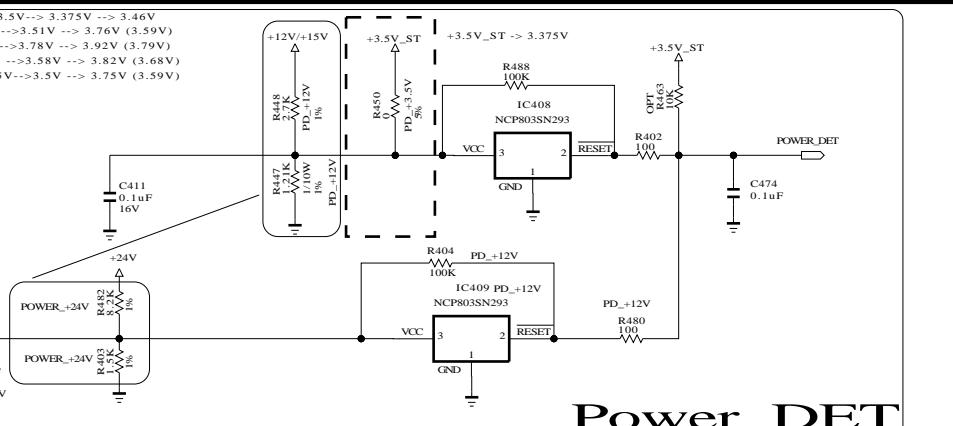
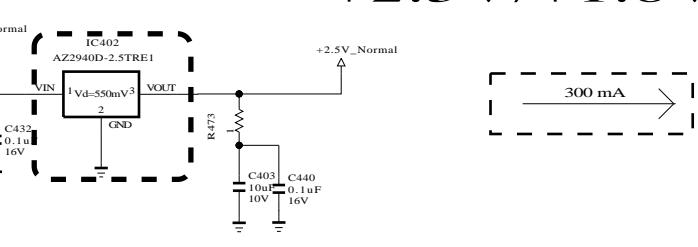
$$V_{out} = (1 + R1/R2) * 0.8$$

# PANEL\_POWER

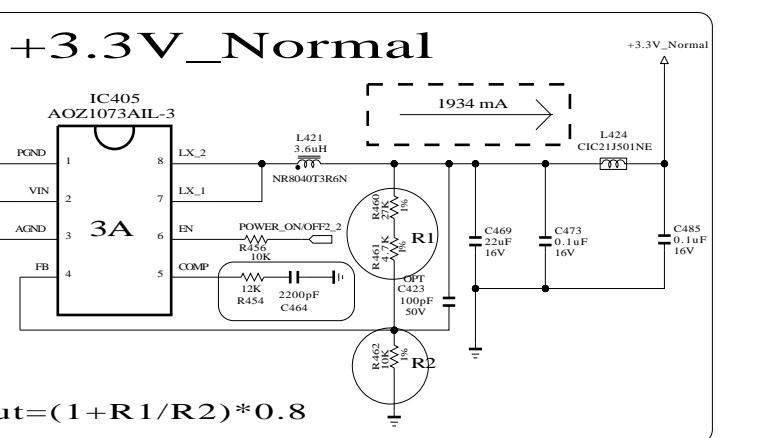


$$V_{out} = 0.827 * (1 + R1/R2) = 1.521 \text{ V}$$

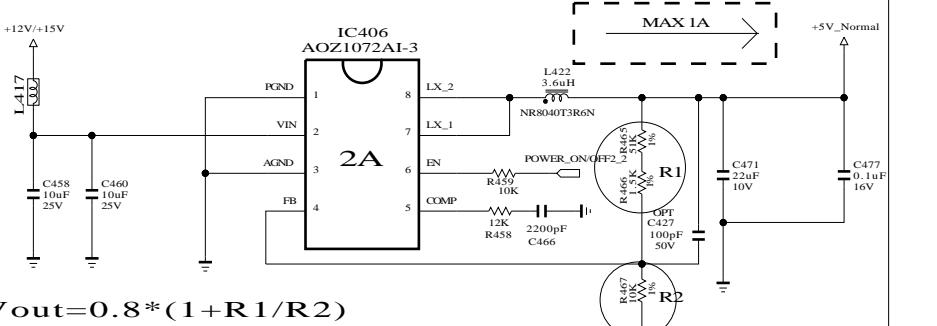
+2.5V/+1.8V



Power DET

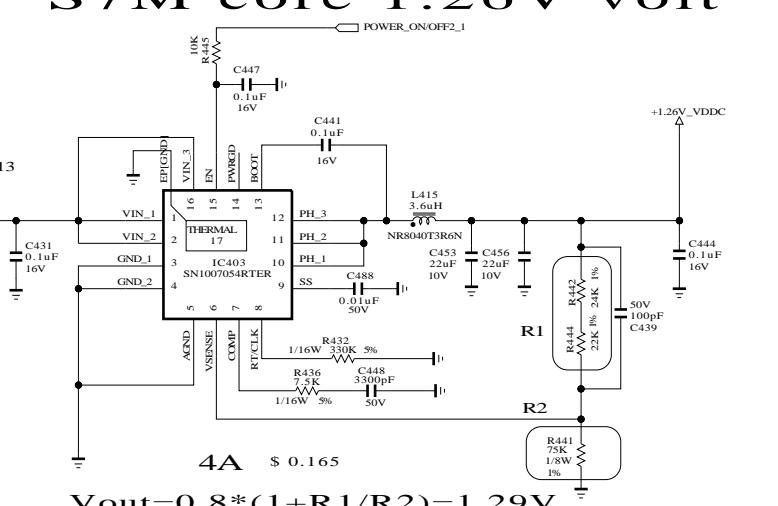


+3.3V\_Normal



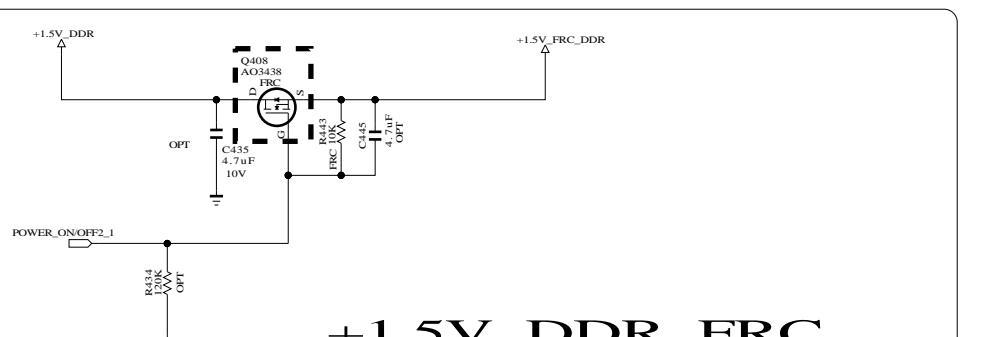
$$V_{out} = 0.8 * (1 + R1/R2)$$

S7M core 1.26V volt



$$V_{out} = 0.8 * (1 + R1/R2) = 1.29 \text{ V}$$

+1.5V\_DDR\_FRC

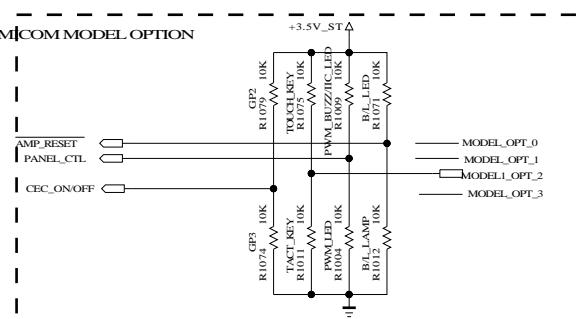
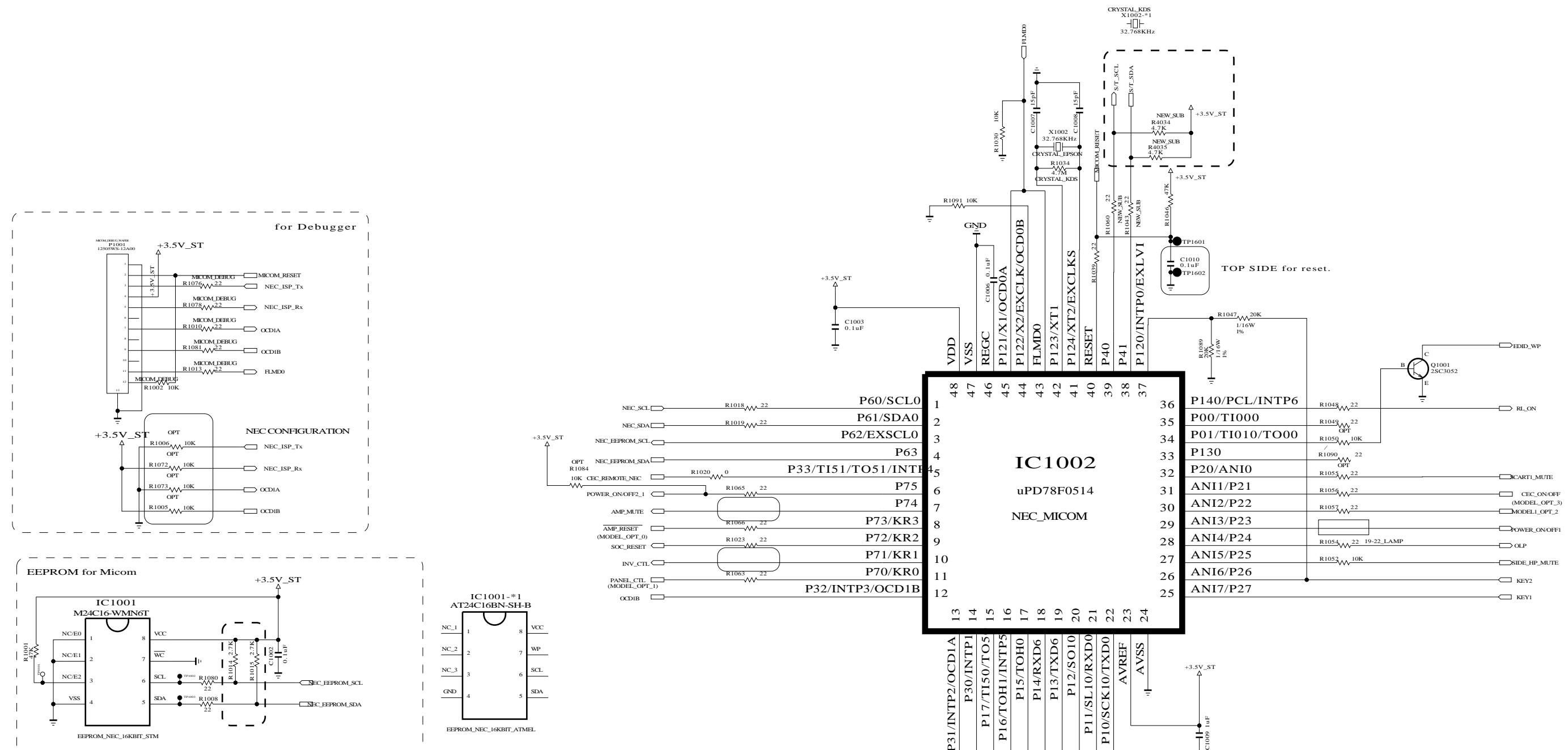


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LG Electronics

LG ELECTRONICS

MODEL	GP2R	DATE	20101023
BLOCK	POWER_LARGE	SHEET	4



2011Y,GP2R, 101125 Update				
MODEL OPTION				
PIN NAME	PIN NO.	HIGH	LOW	
MODEL_OPT_0	8	B/L_LED	B/L_LAMP	
MODEL_OPT_1	11	PWM_BUZZ_IIC_LED	PWM_LED	
MODEL_OPT_2	30	TOUCH_KEY	TACT_KEY	
MODEL_OPT_3	31	GP2	GP3	
PWM_BUZZ/IIC_LED : Using IIC for LED Breathing & PWM Buzz PWM_LED : Using PWM Signal for LED Lighting				

PIN NAME	PIN NO.	HIGH	LOW	Description
MODEL_OPT_0	8	LOW	LOW	LK330/LK450 for KR/US 10Y EYE-Q Sensor
MODEL_OPT_1	11	LOW	LOW	KEY & PWM LED & No Buzz & No LED Blink
MODEL_OPT_2	30	HIGH	HIGH	KEY & PWM LED & No Buzz & No LED Blink
MODEL_OPT_3	31	LOW	LOW	LV25/LV35/LV45/LV45/LV55/LK45/LK55 S/T & IIC LED & NO BUZZ & LED Blink
				IIC LED(09Y IIC Protocol) & NO BUZZ
				S/T & IIC LED & No Buzz & LED Blink

2010Y,GP2				
MODEL OPTION				
PIN NAME	PIN NO.	HIGH	LOW	
MODEL_OPT_0	8	LOW	LOW	LOW
MODEL_OPT_1	11	PWM_BUZZ_IIC_LED	PWM_LED	HIGH
MODEL_OPT_2	30	TOUCH_KEY	TACT_KEY	HIGH
MODEL_OPT_3	31	GPIO_LED	NON_GPIO_LED	LOW
PWM_BUZZ/IIC_LED : For model that use LED Lighting used IIC PWM_LED : For model that use LED Lighting used PWM Signal				

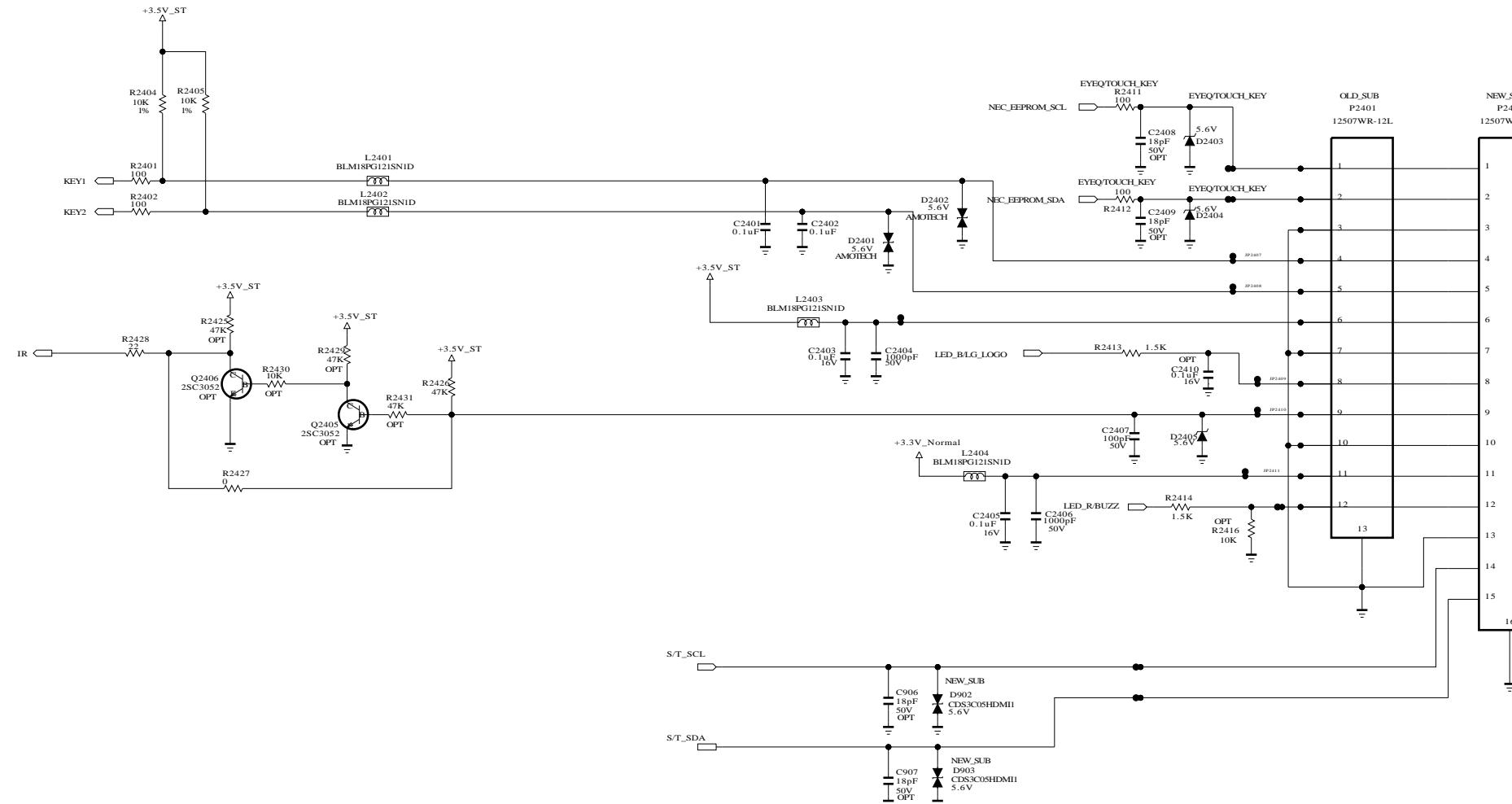
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MODEL BLOCK	GP2R	DATE	20101125
	MICOM Rev.4	SHEET	5

**CONTROL**  
**IR & LED**

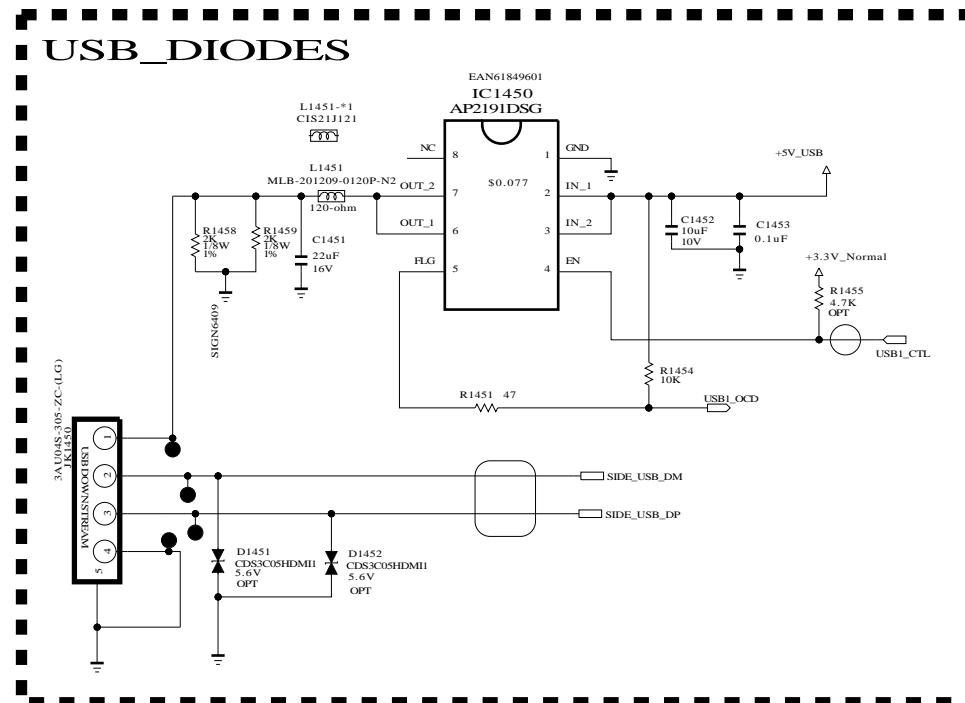


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<b>MODEL</b>	<b>GP2R</b>	<b>DATE</b>	20101023
<b>BLOCK</b>	IR/CONTROL-L	<b>SHEET</b>	6

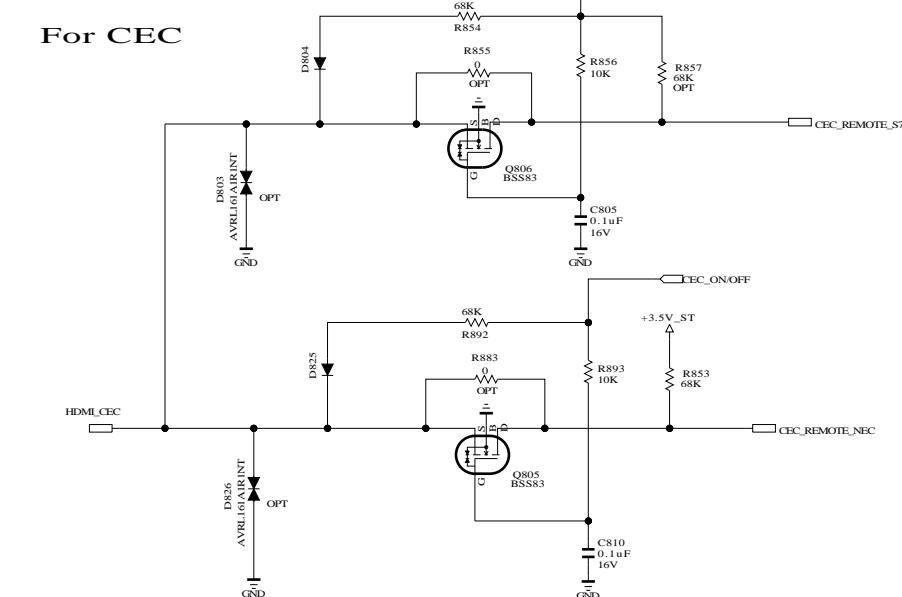
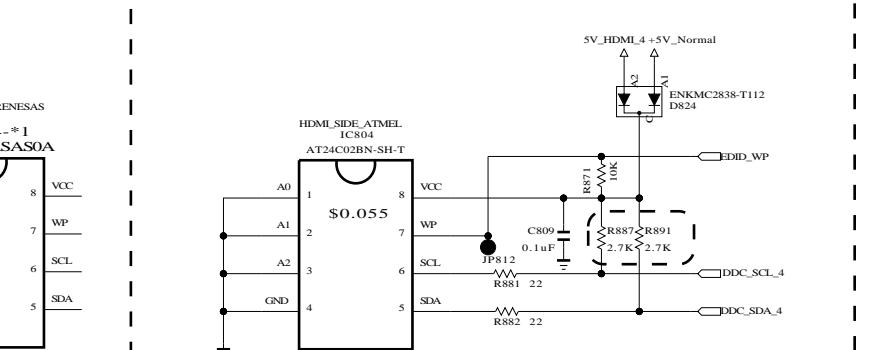
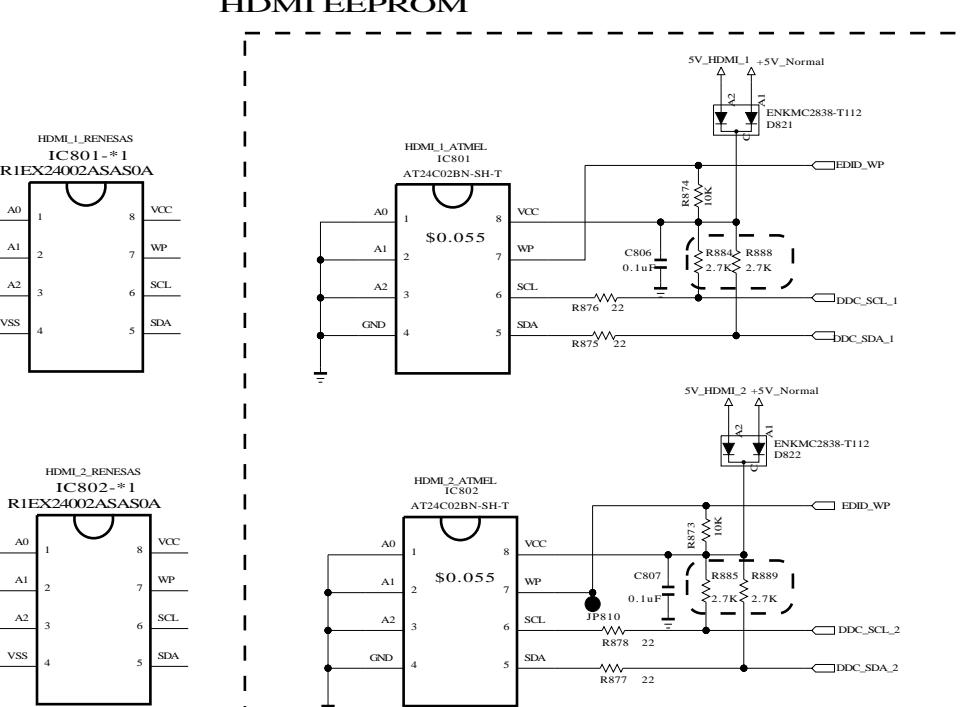
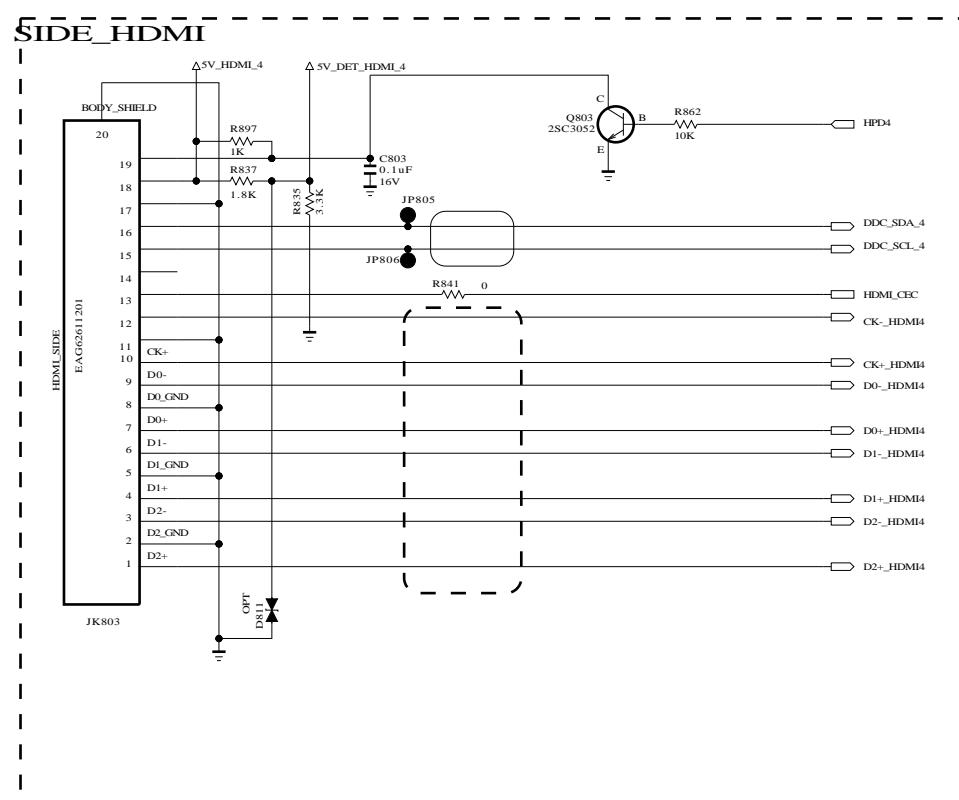
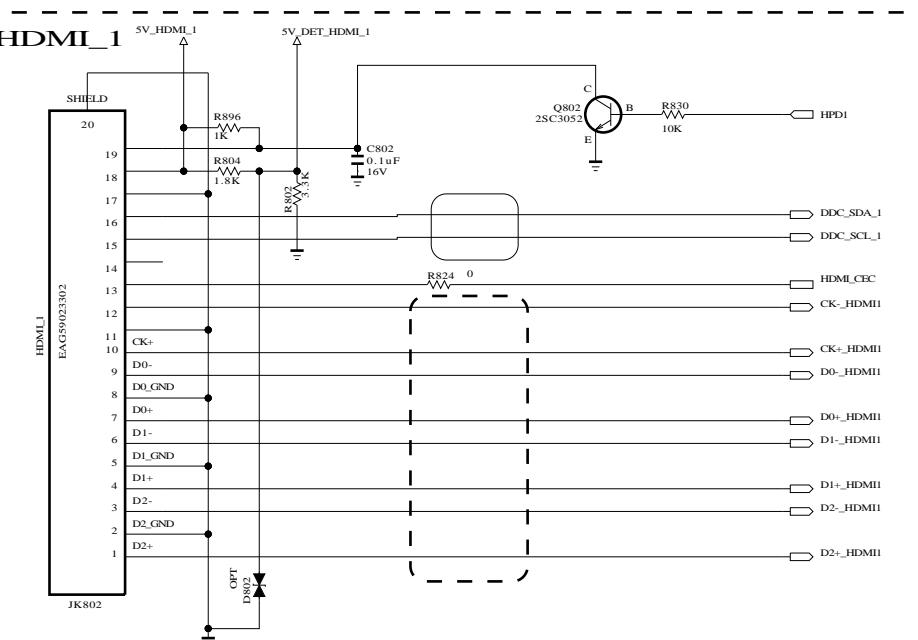


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MODEL	GP2R	DATE	20101023
BLOCK	USB_OCP_DIODE	SHEET	7



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SECRET

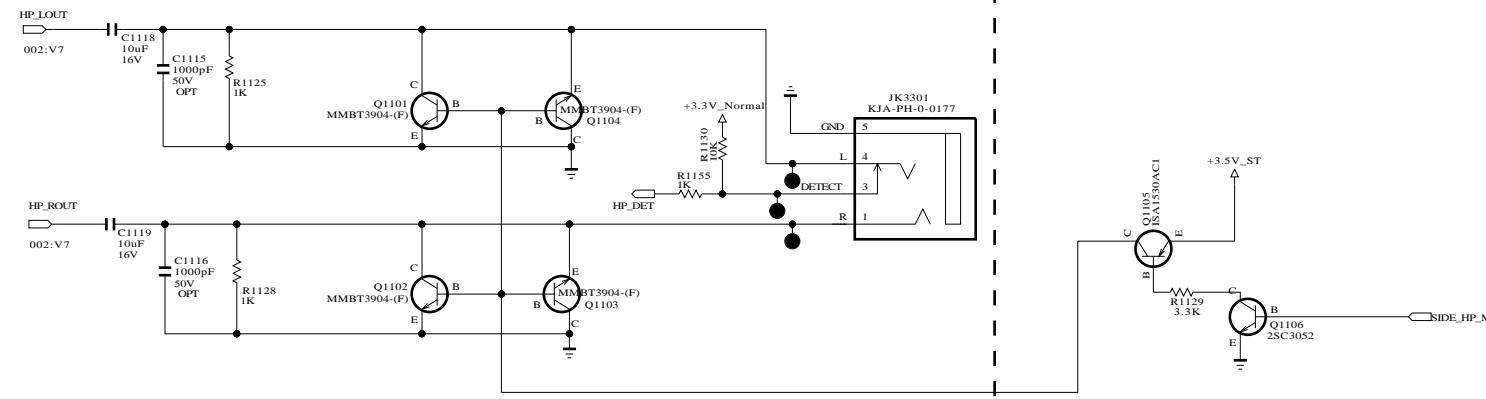
LG ELECTRONICS

MODEL	GP2R	DATE	20101023
DISPLAY	HDMI	SHEET	8 /

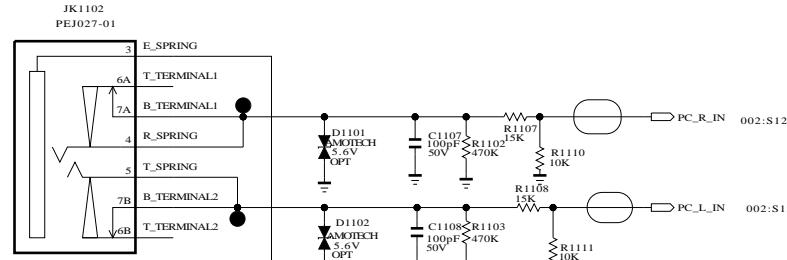
# RGB/SPDIF/PC/HP

## New Item Development

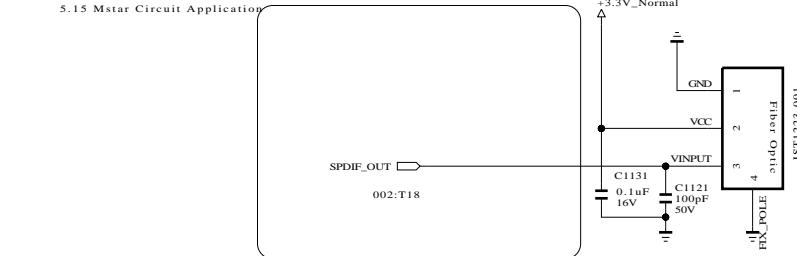
### EARPHONE BLOCK



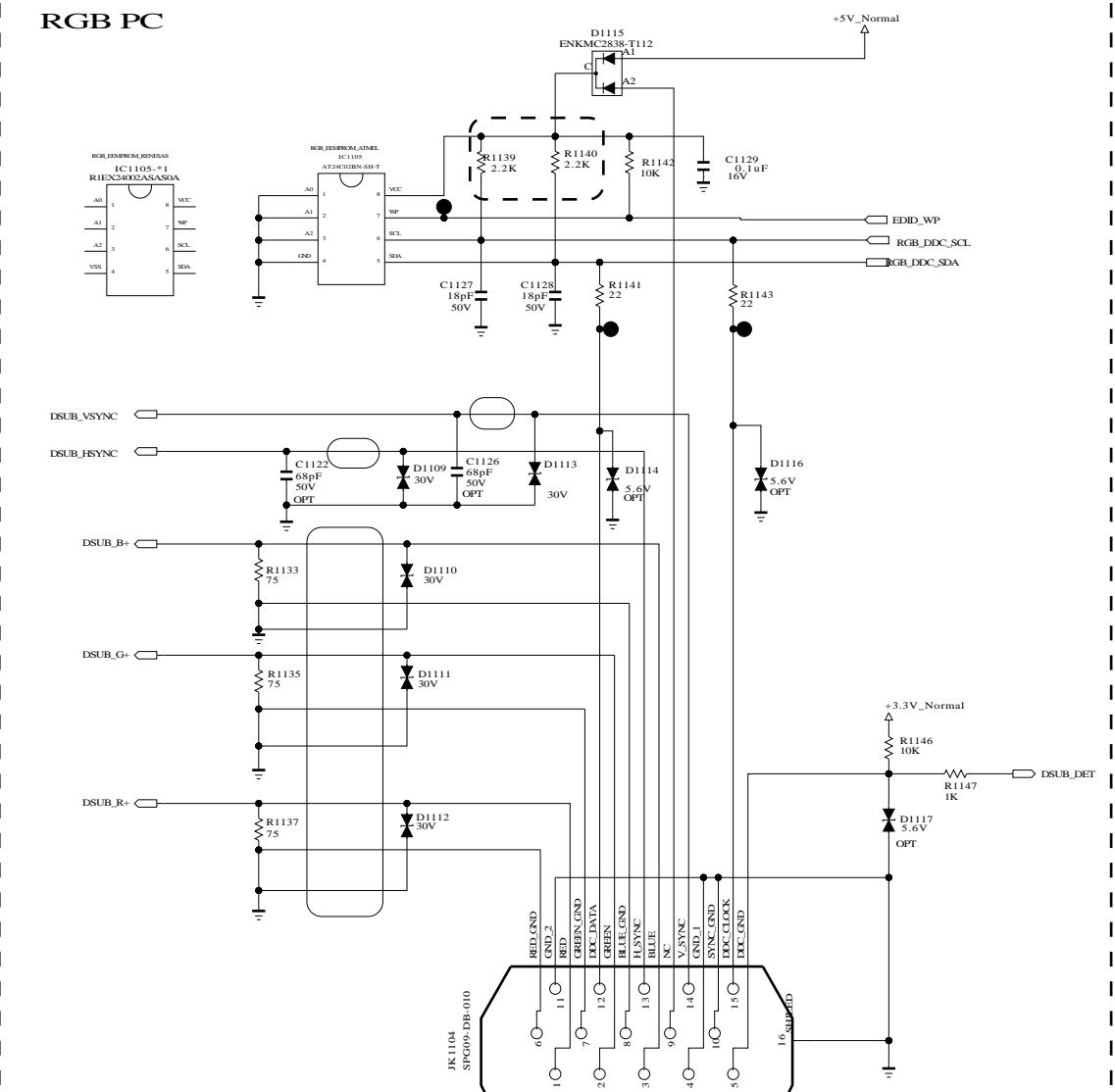
### PC AUDIO



### SPDIF OPTIC JACK



### RGB PC

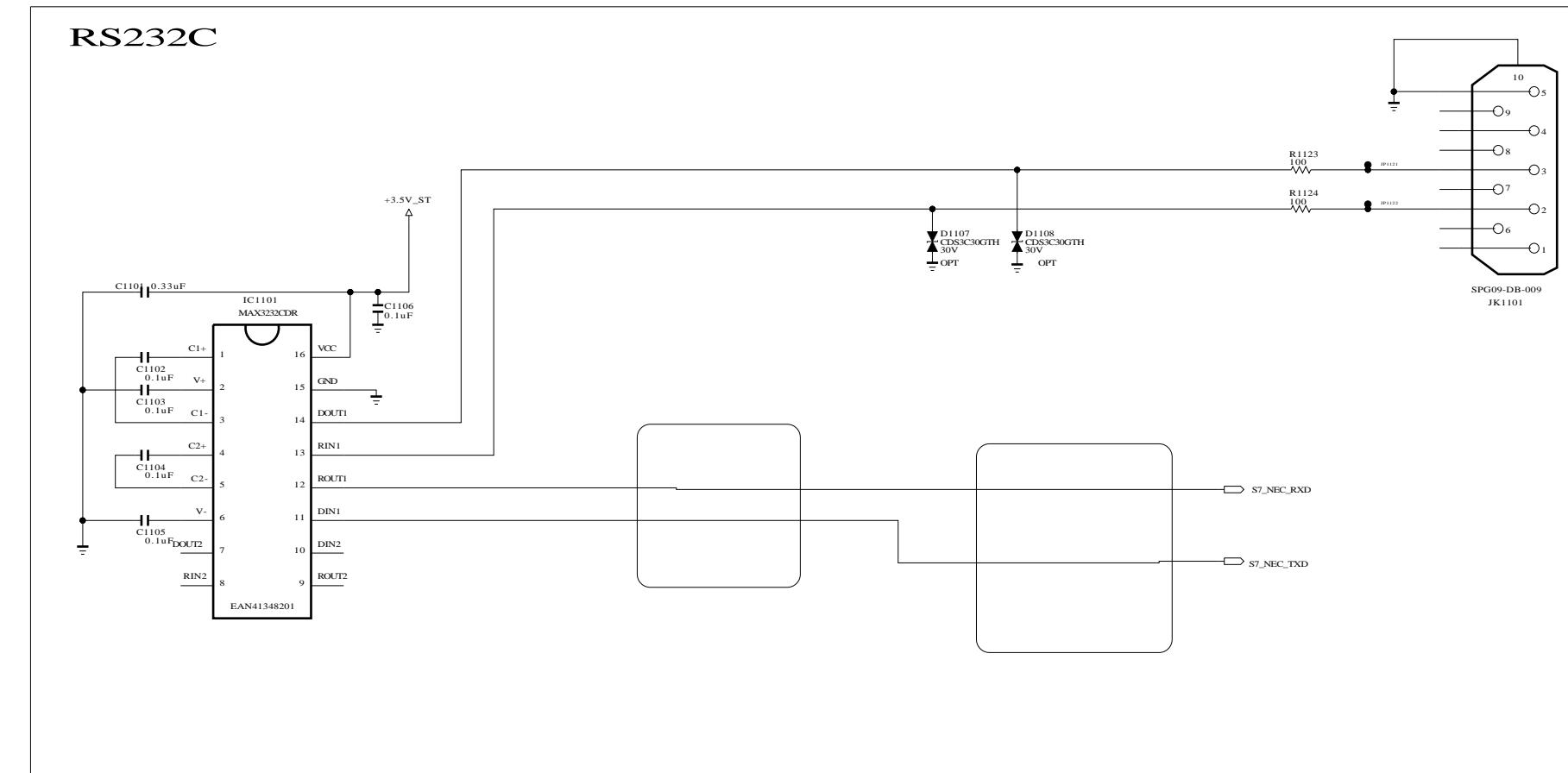


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LG ELECTRONICS

MODEL	GP2R	DATE	20101023
BLOCK	RGB/SPDIF/HP	SHEET	9

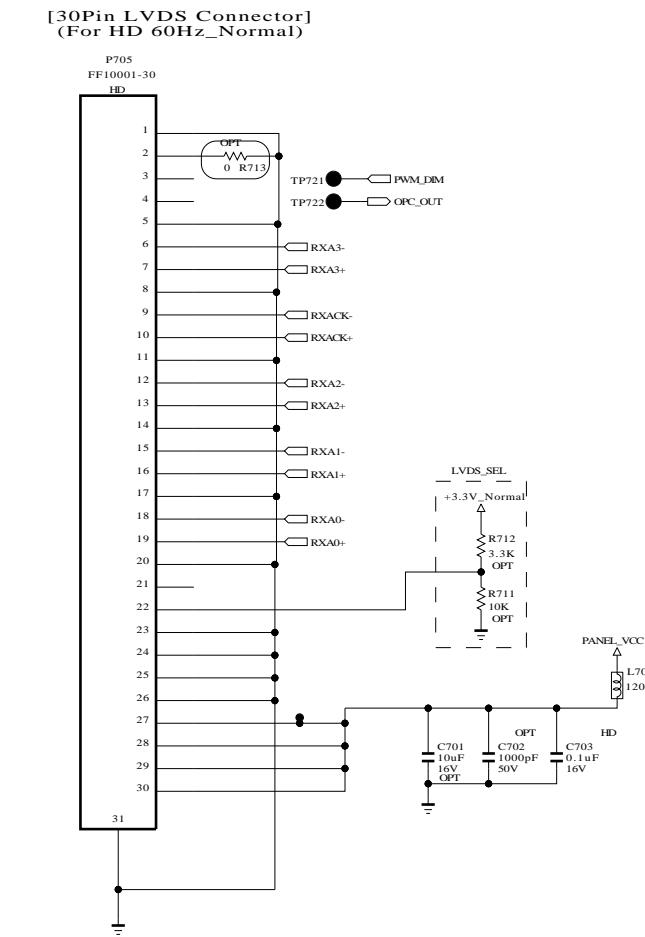
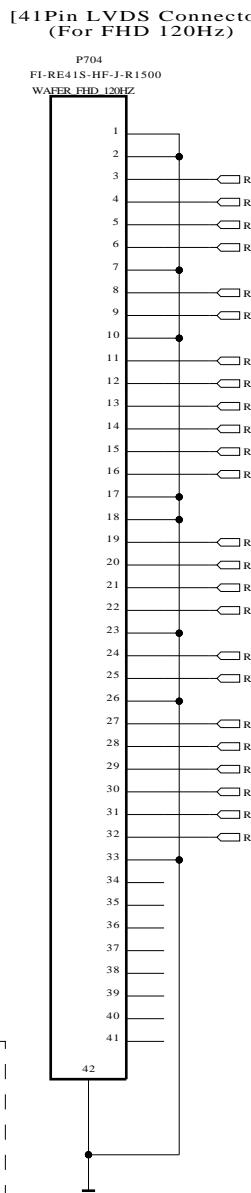
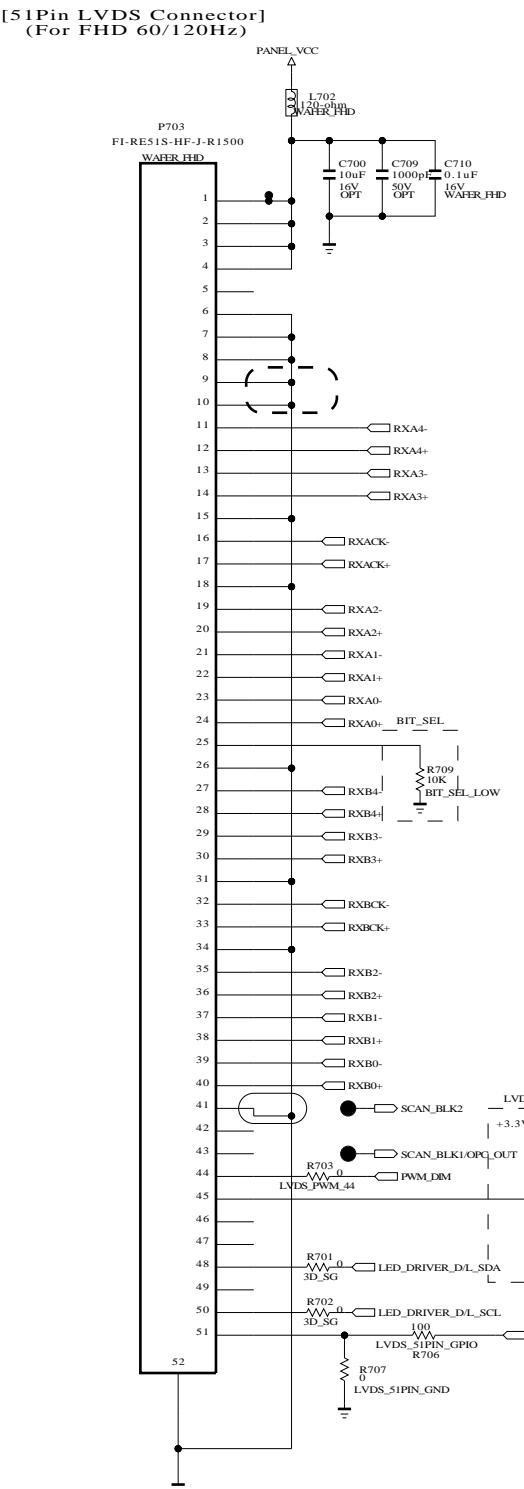


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LG ELECTRONICS

MODEL BLOCK	GP2R RS232C_9PIN	DATE SHEET	20101023 10 /
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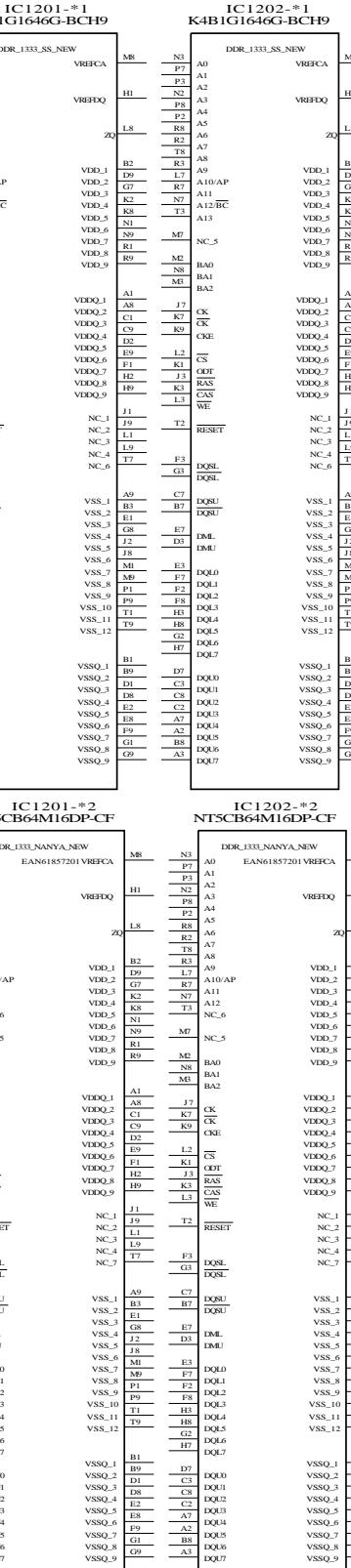
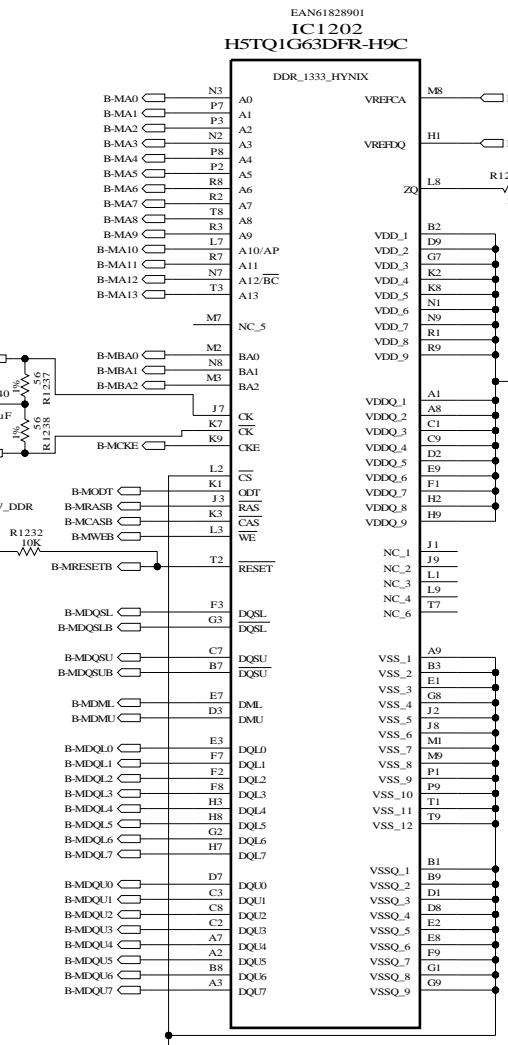
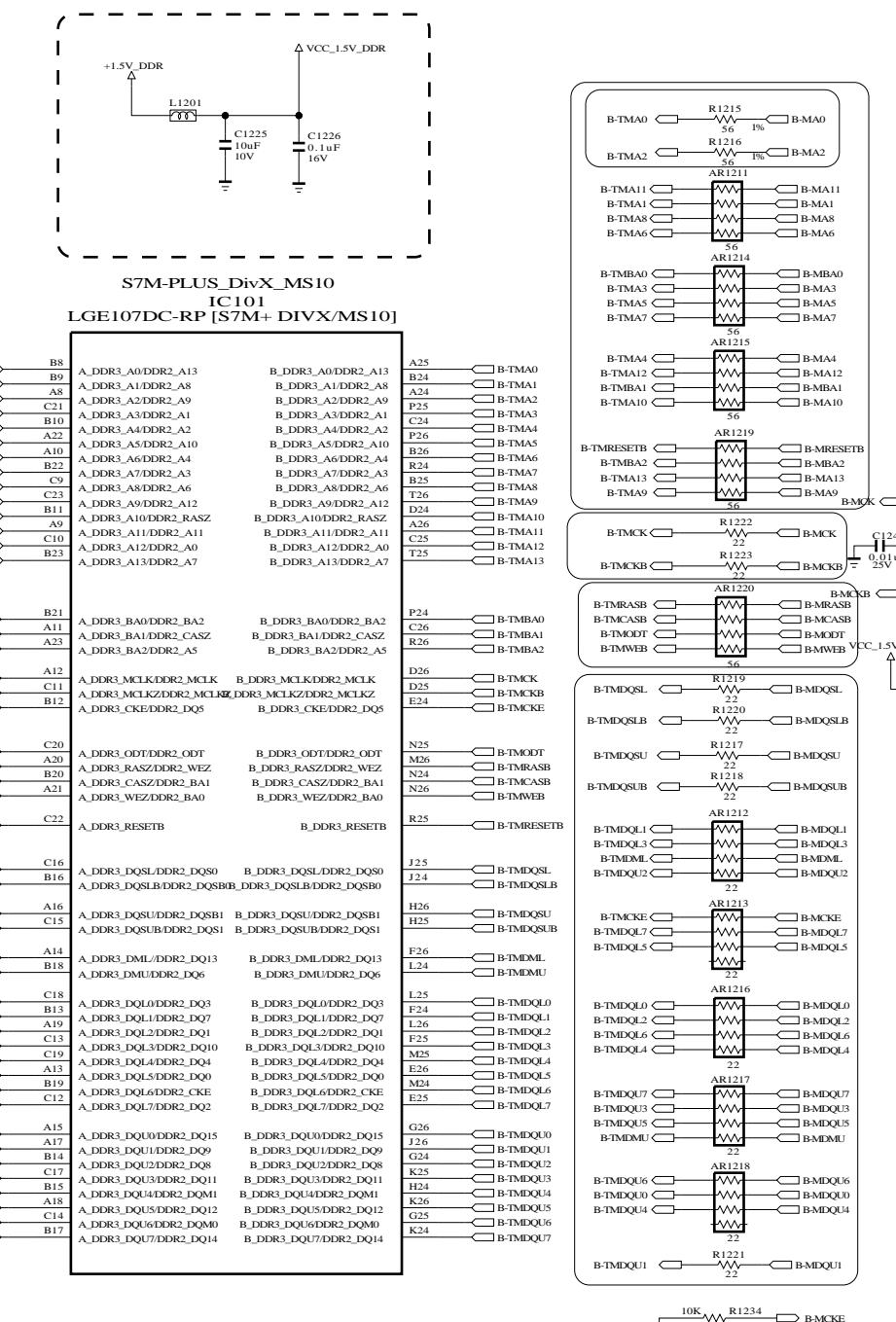
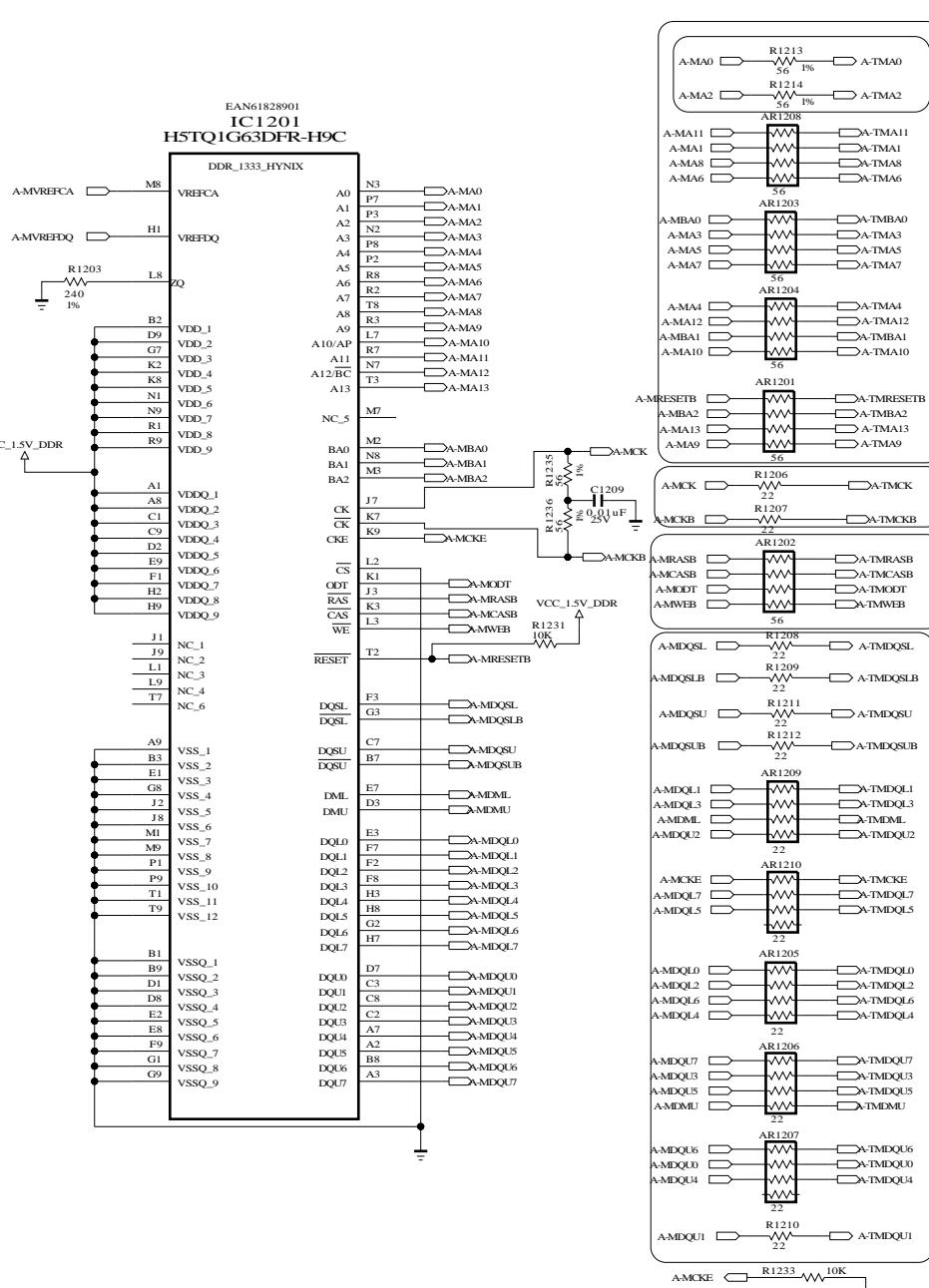
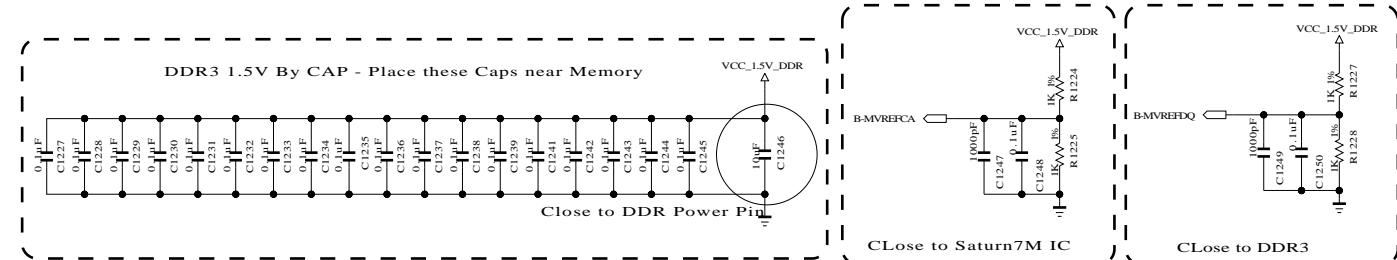
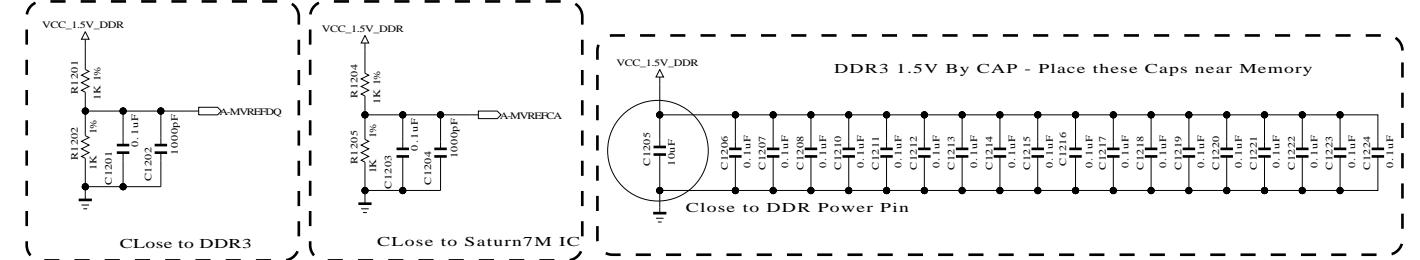


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SECRET



MODEL	GP2R	DATE	20101023
BITK	LVDS LARGE	SHEET	11 /

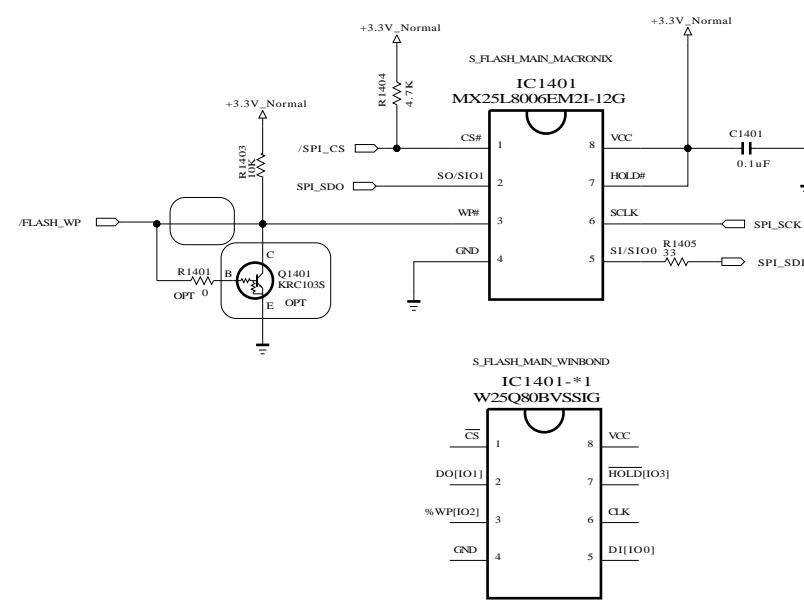


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SECRET



MODEL	GP2R	DATE	20101023
BIOS	DDR 256	SHEET	12 /



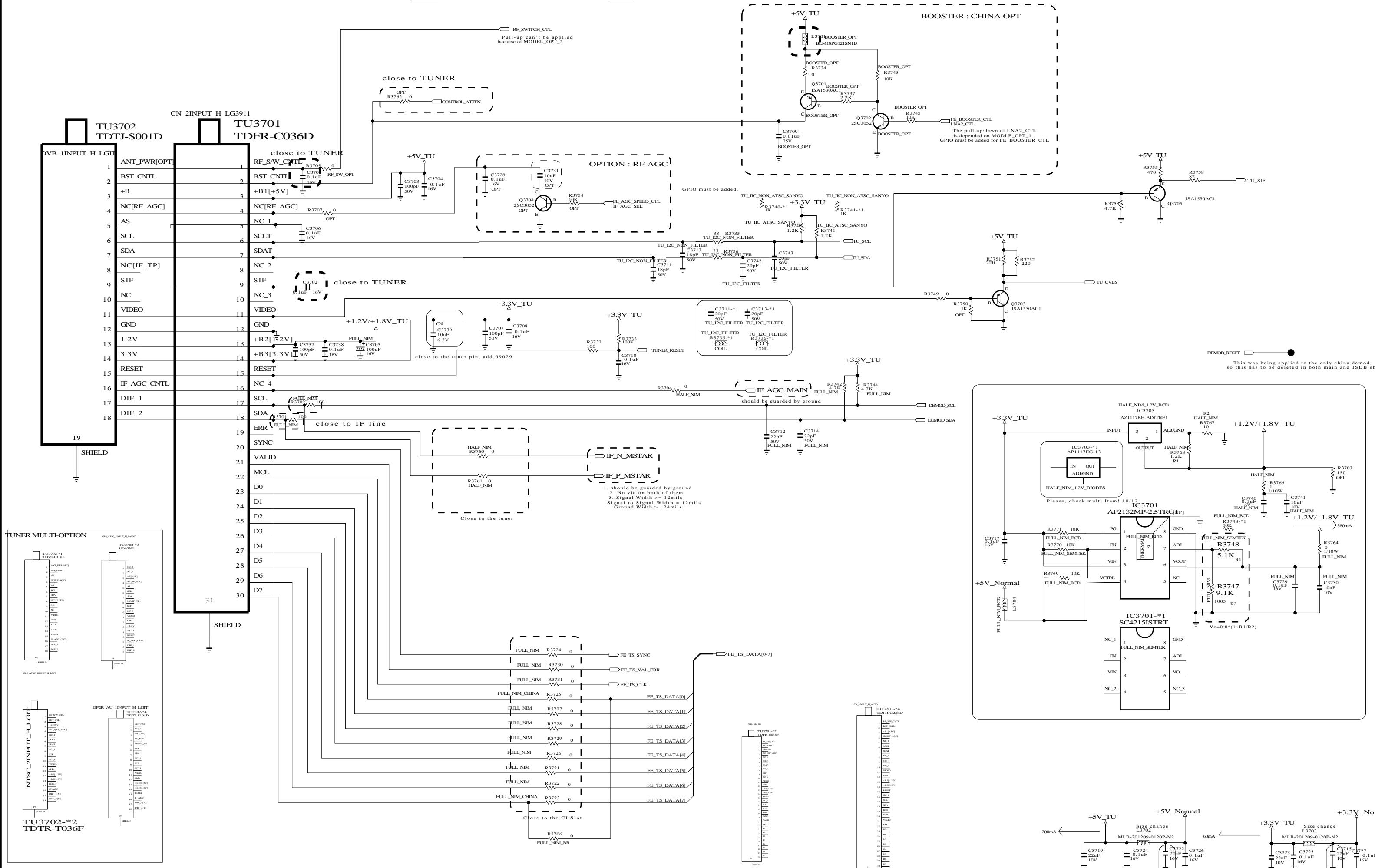
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LG ELECTRONICS

MODEL	GP2R	DATE	20101023
BLOCK	FLASH 1MB	SHEET	13 /

# GP2R\_LARGE\_TUNER



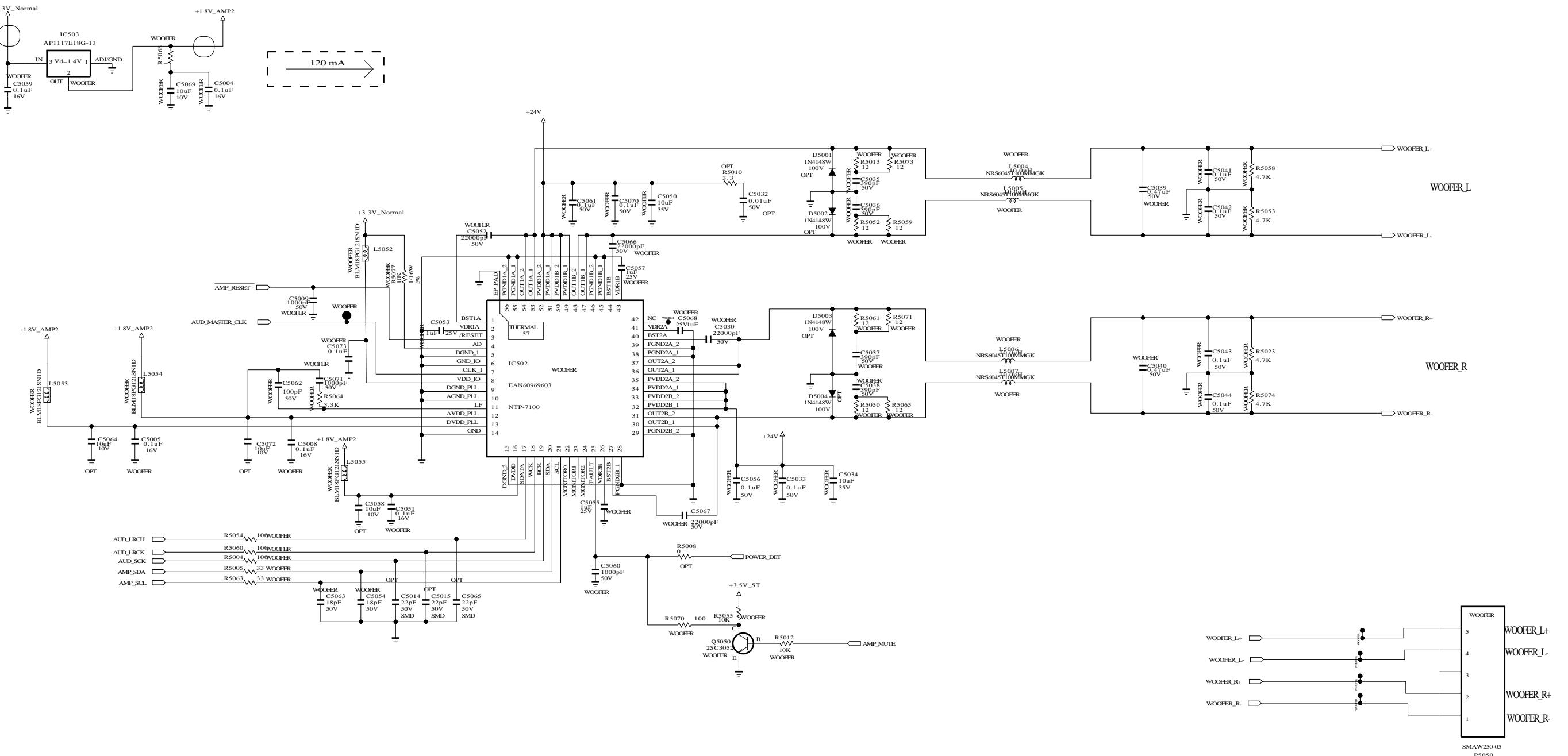
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SECRET



MODEL	GP2R	DATE	20101023
BLOCK	TUNER I	SHEET	14 /

# WOOFER AMP

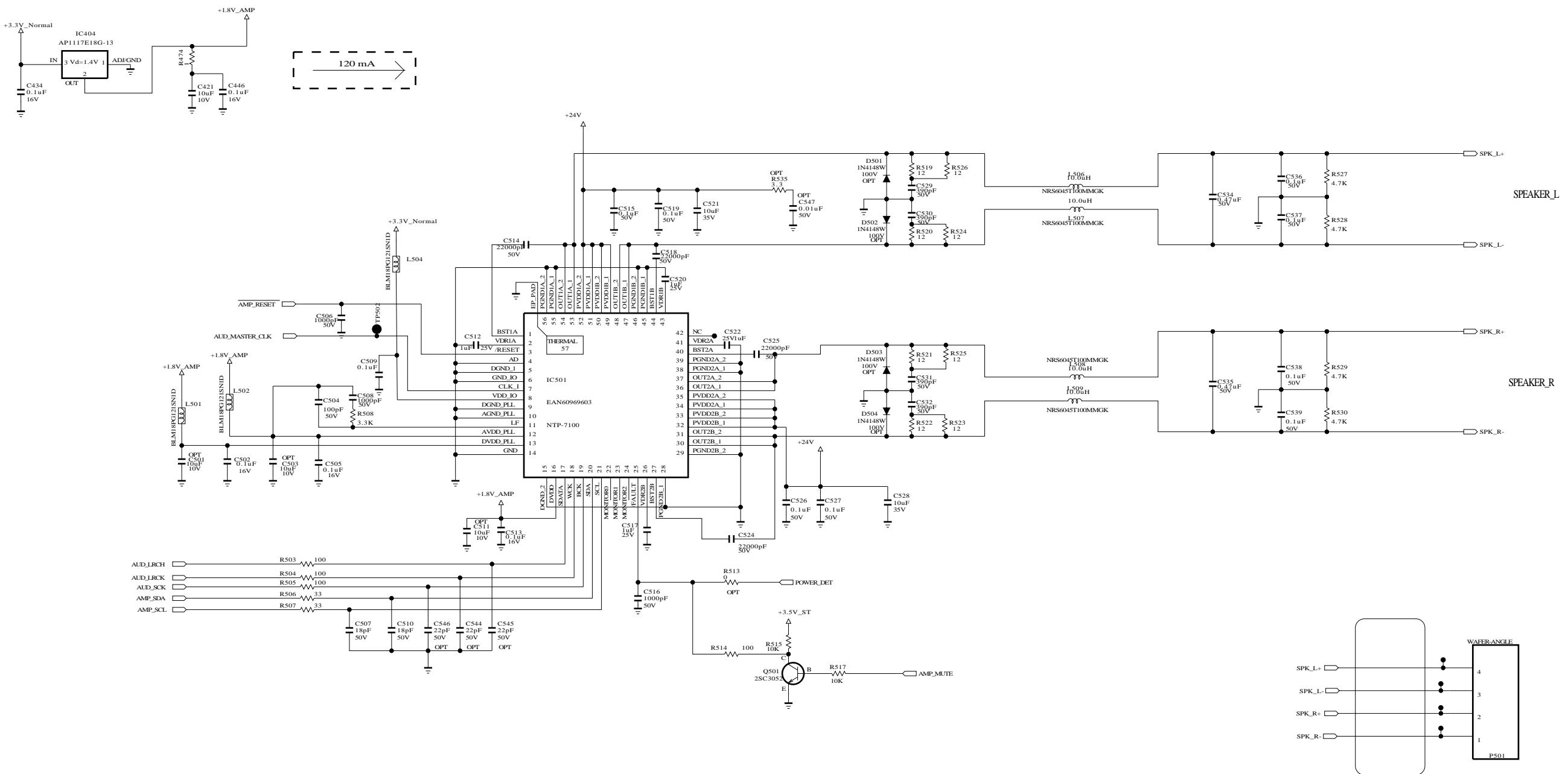


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MODEL	GP2R	DATE	20101023
BLOCK	WOOFER_NTE	SHEET	15 /

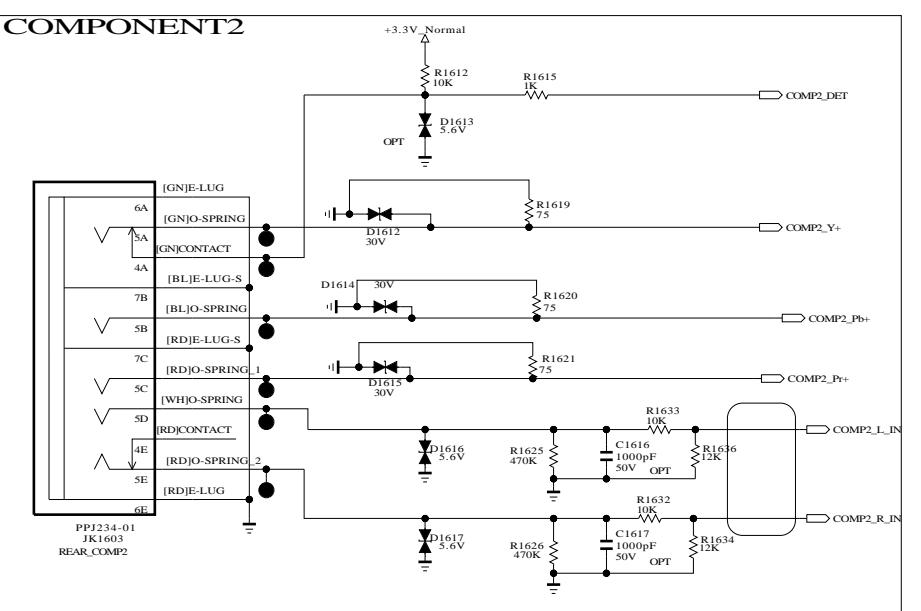
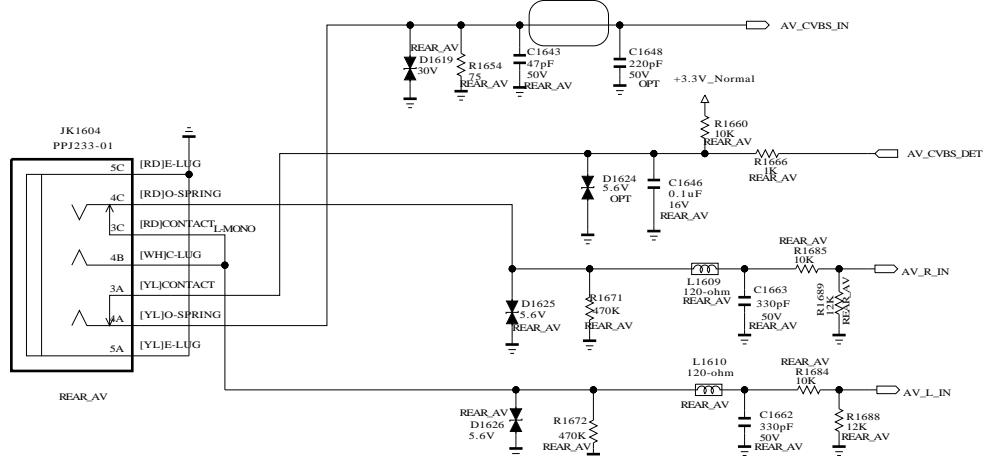


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILTER AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

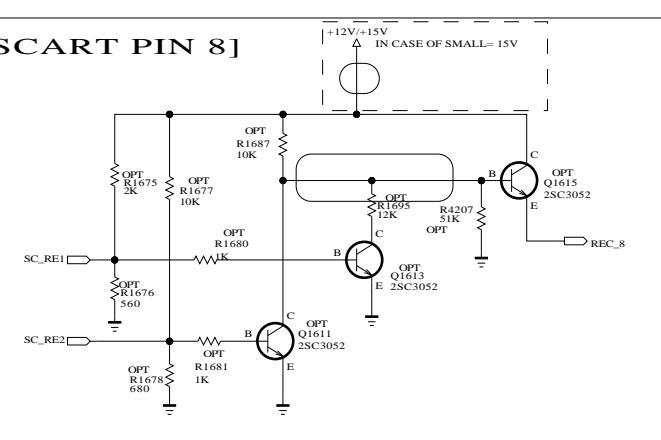
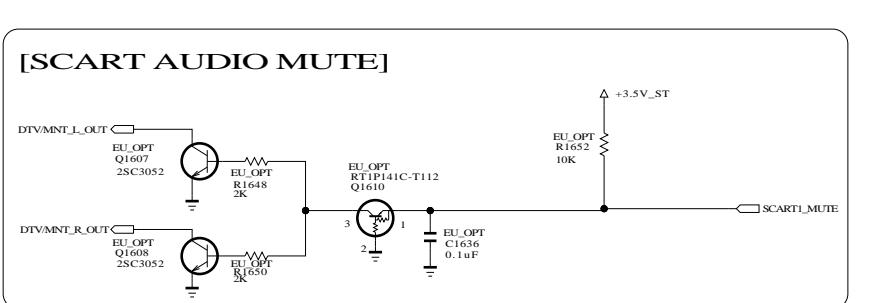
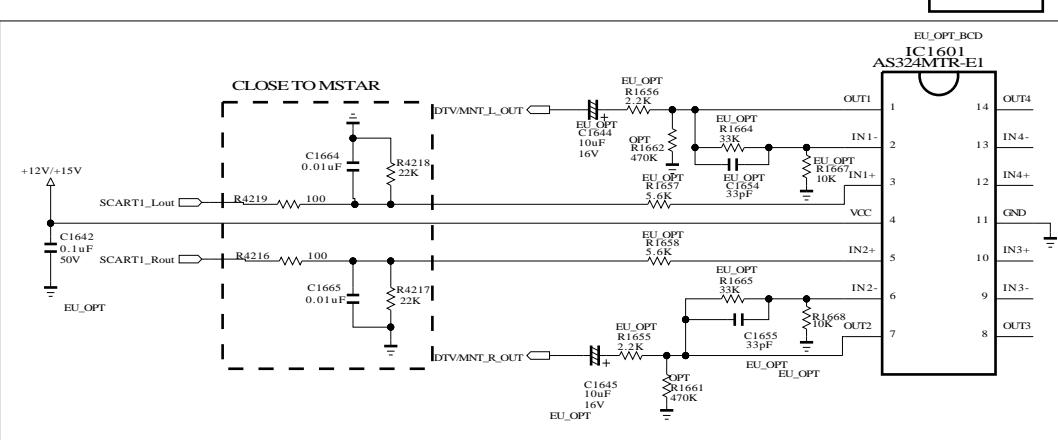
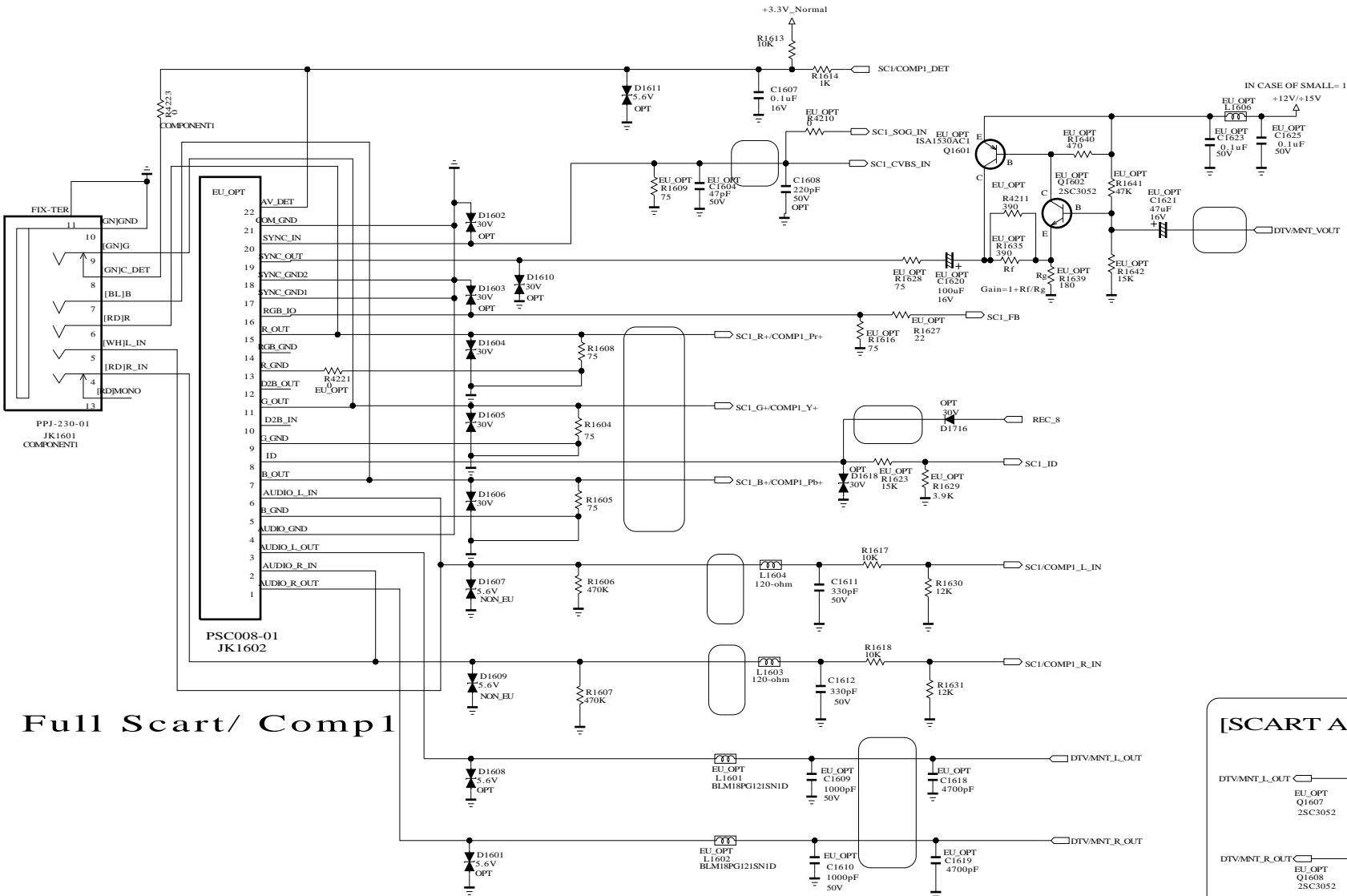
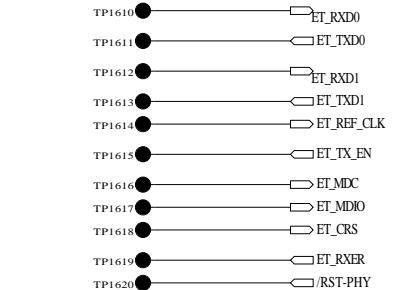
SECRET  
LG Electronics

LG ELECTRONICS

MODEL	GP2R	DATE	20101023
BLOCK	AMP_NTP	SHEET	16 /

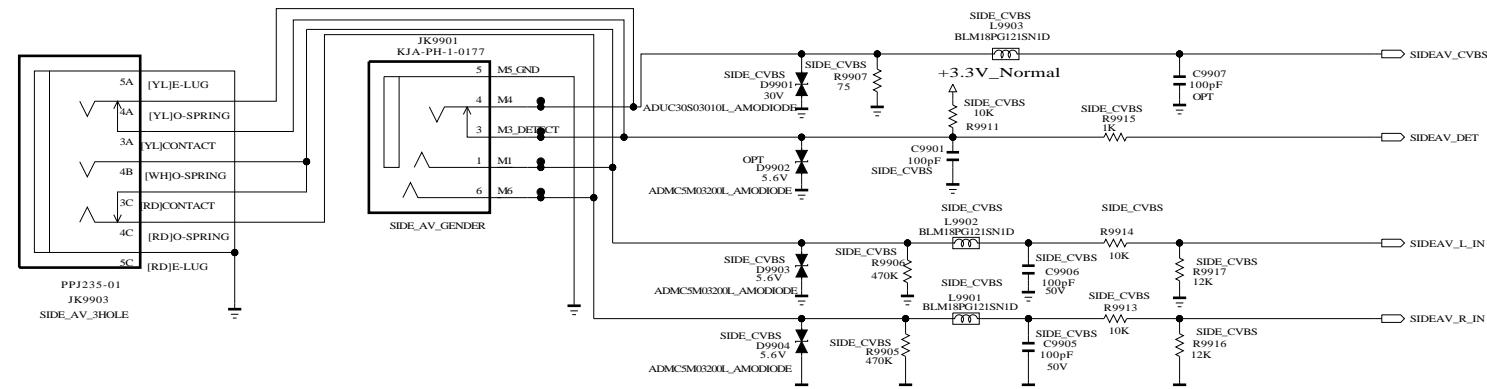


## ETHERNET FOR DVB\_T2

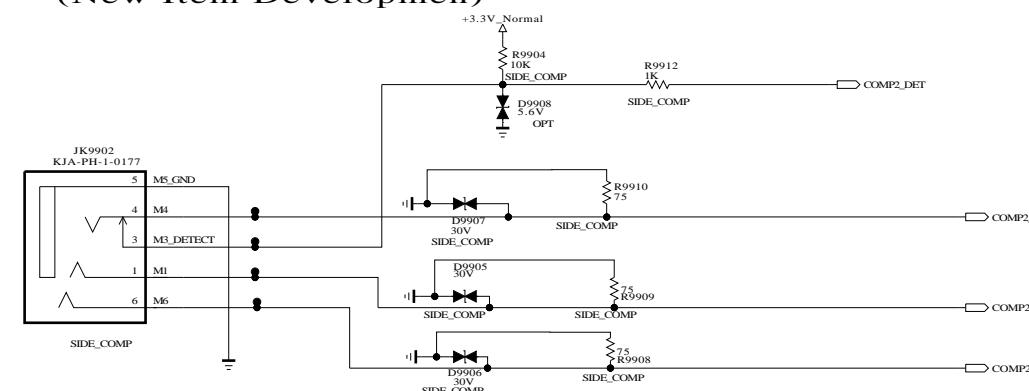


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILTER AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

## SIDE CVBS PHONE JACK (New Item Development)



## SIDE COMPONENT PHONE JACK (New Item Developmen)



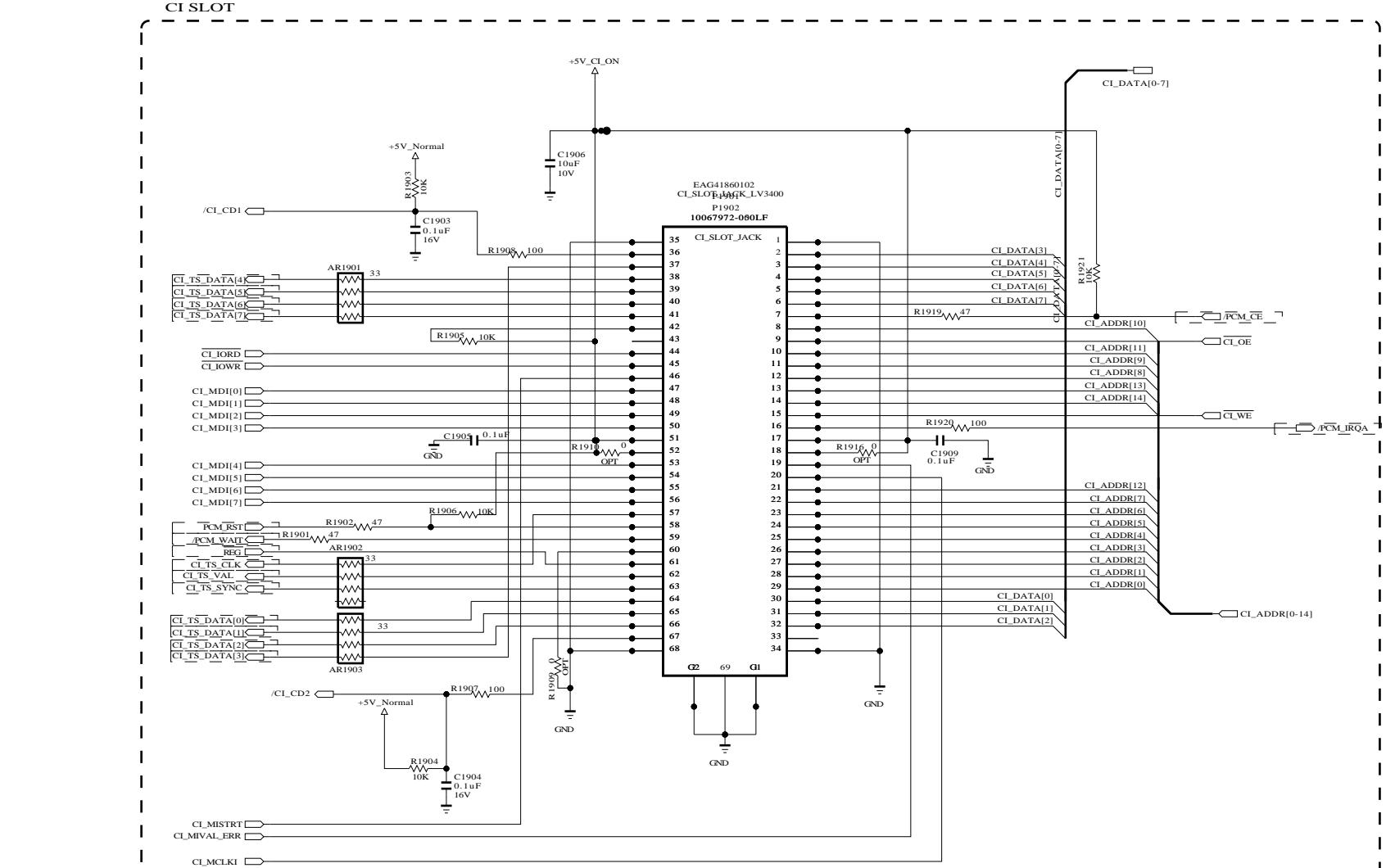
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILTER AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURER SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET

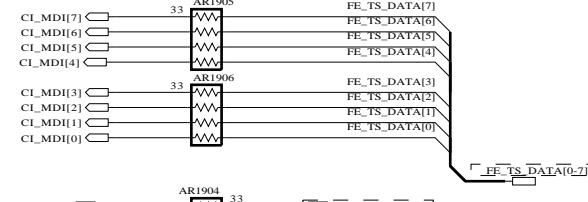


MODEL	GP2R	DATE	20101023
BLURK	SIDE JACK	SHEET	18 /

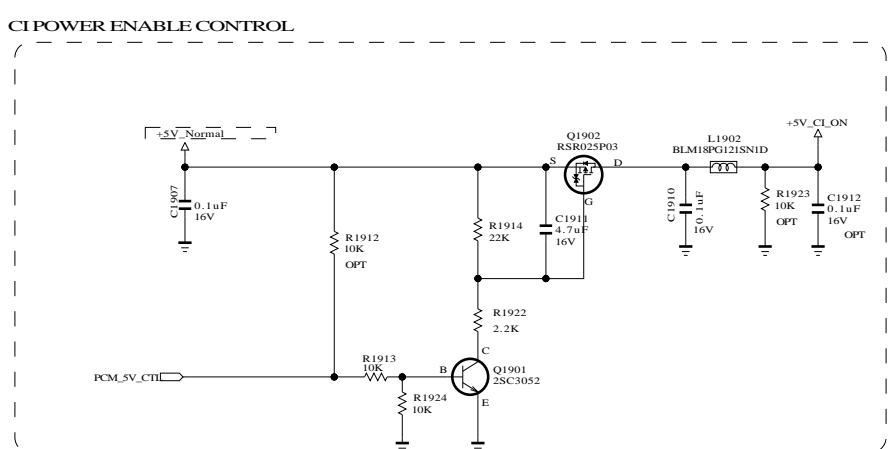
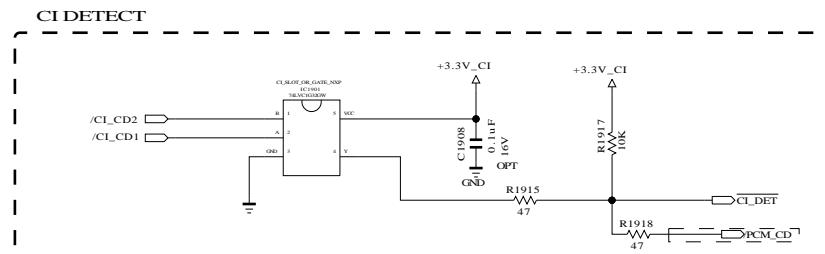
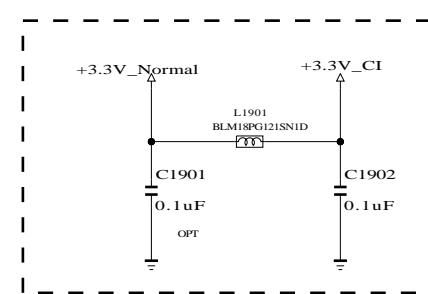
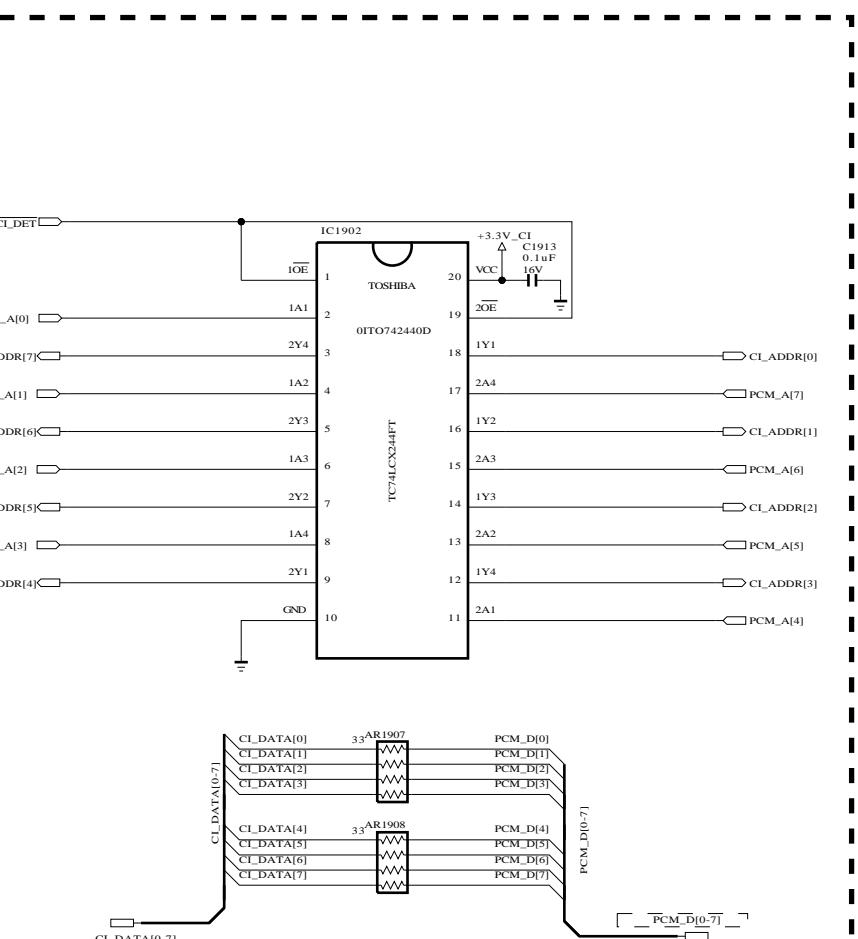
## CI Region



## CI TS INPUT



## CI HOST I/F



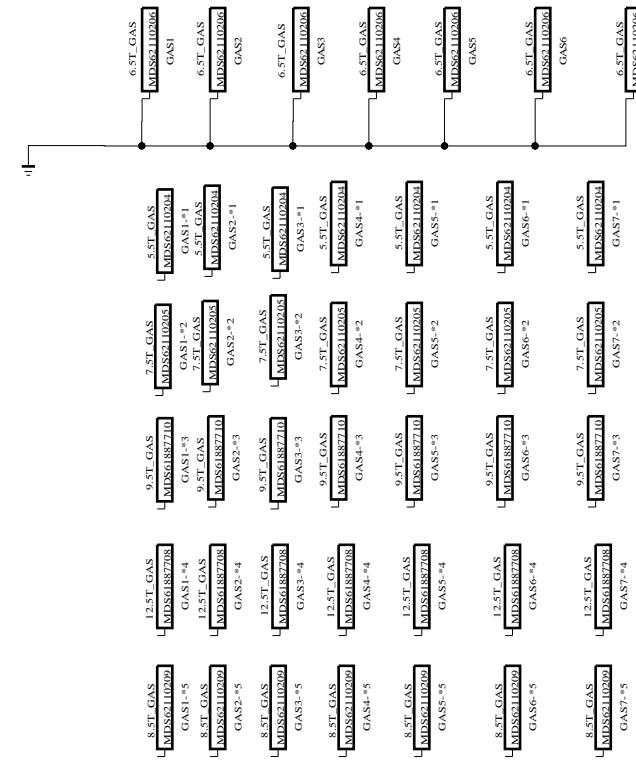
The symbol mark of this schematic diagram incorporates special features important for protection from X-radiation. Filter and electrical shock hazards, when servicing if is essential that only manufacturers specified parts be used for the critical components in the symbol mark of the schematic.

**SECRET**  
LG Electronics

LG ELECTRONICS

MODEL	GP2R	DATE	20101023
BLOCK	PCMCI	SHEET	20

## SMD GASKET

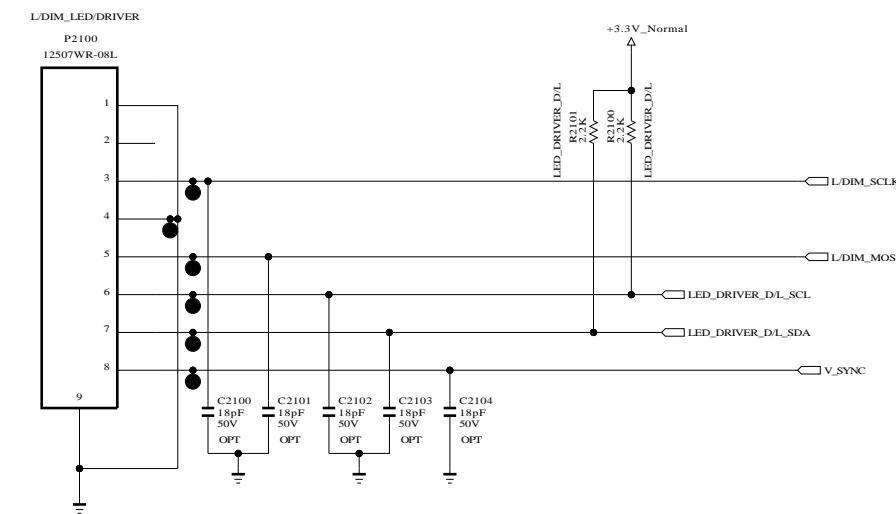


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. IT IS ESSENTIAL THAT ONLY MANUFACTURED SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET  
LG Electronics

LG ELECTRONICS

MODEL	GP2R	DATE	20101023
BLOCK	SMD_GAS	SHEET	20 /

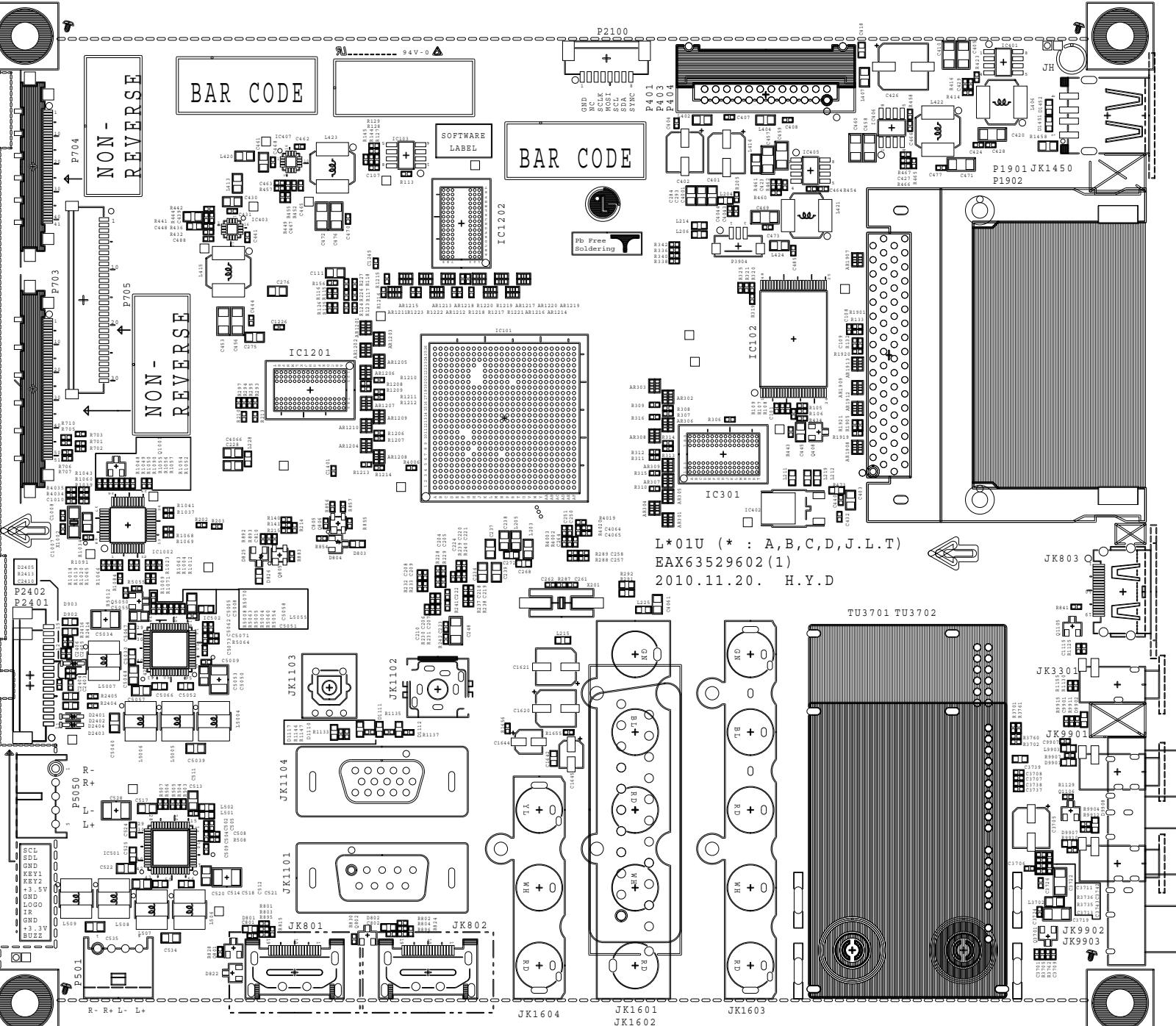


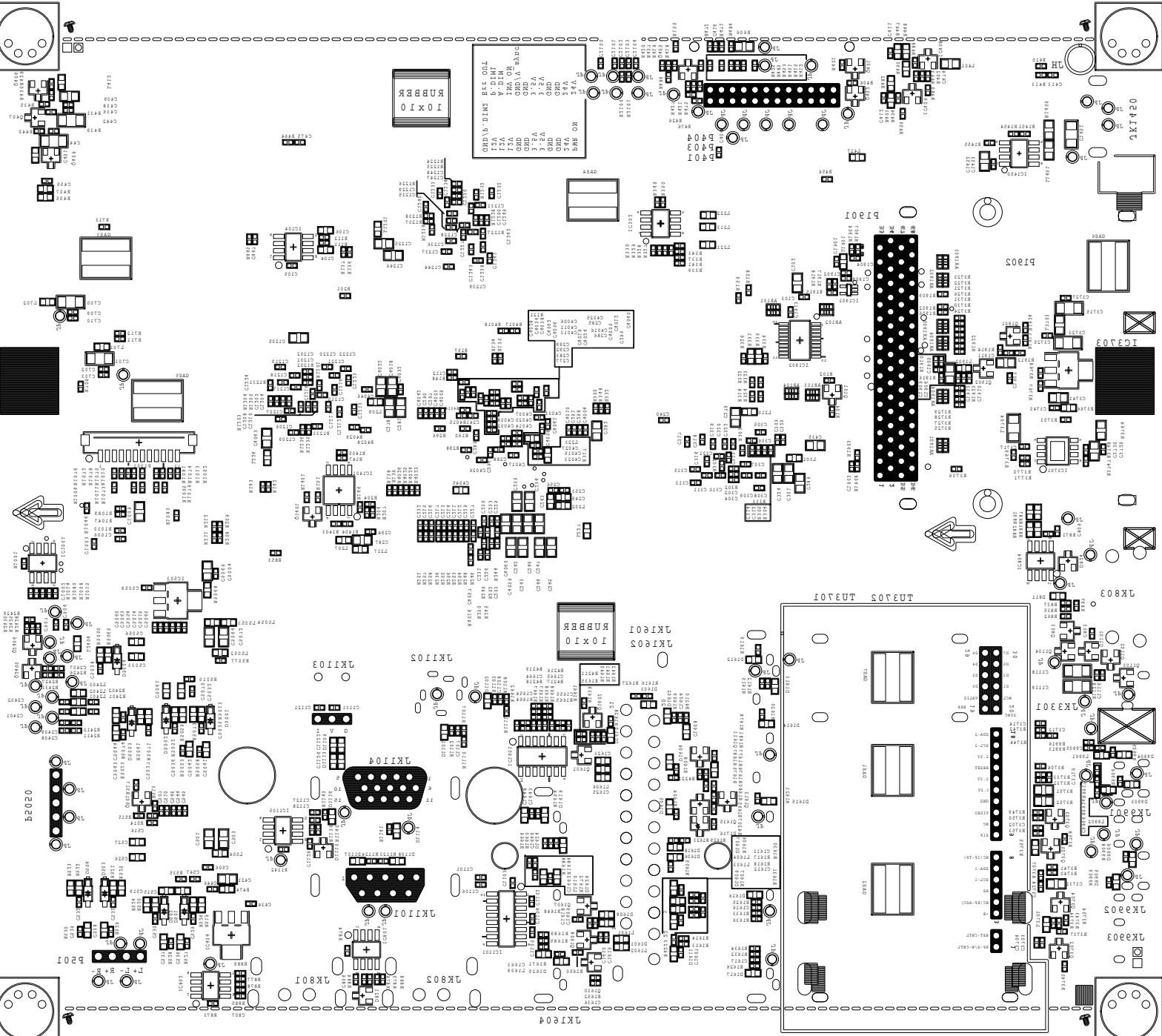
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. IT IS ESSENTIAL THAT ONLY MANUFACTURED SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

LG ELECTRONICS

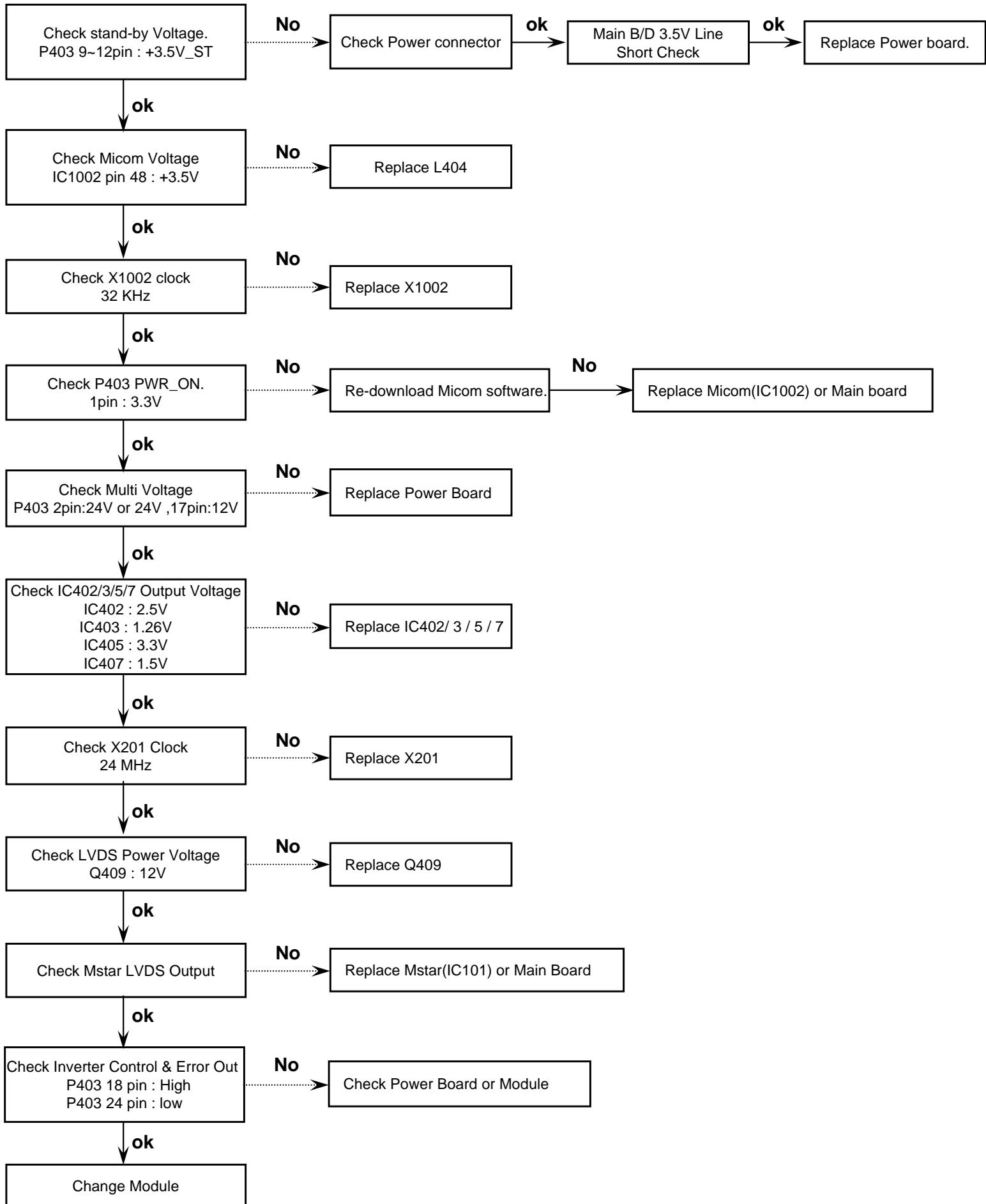
MODEL	GP2R	DATE	20101023
BLOCK	L/DIM_LED	SHEET	21 /



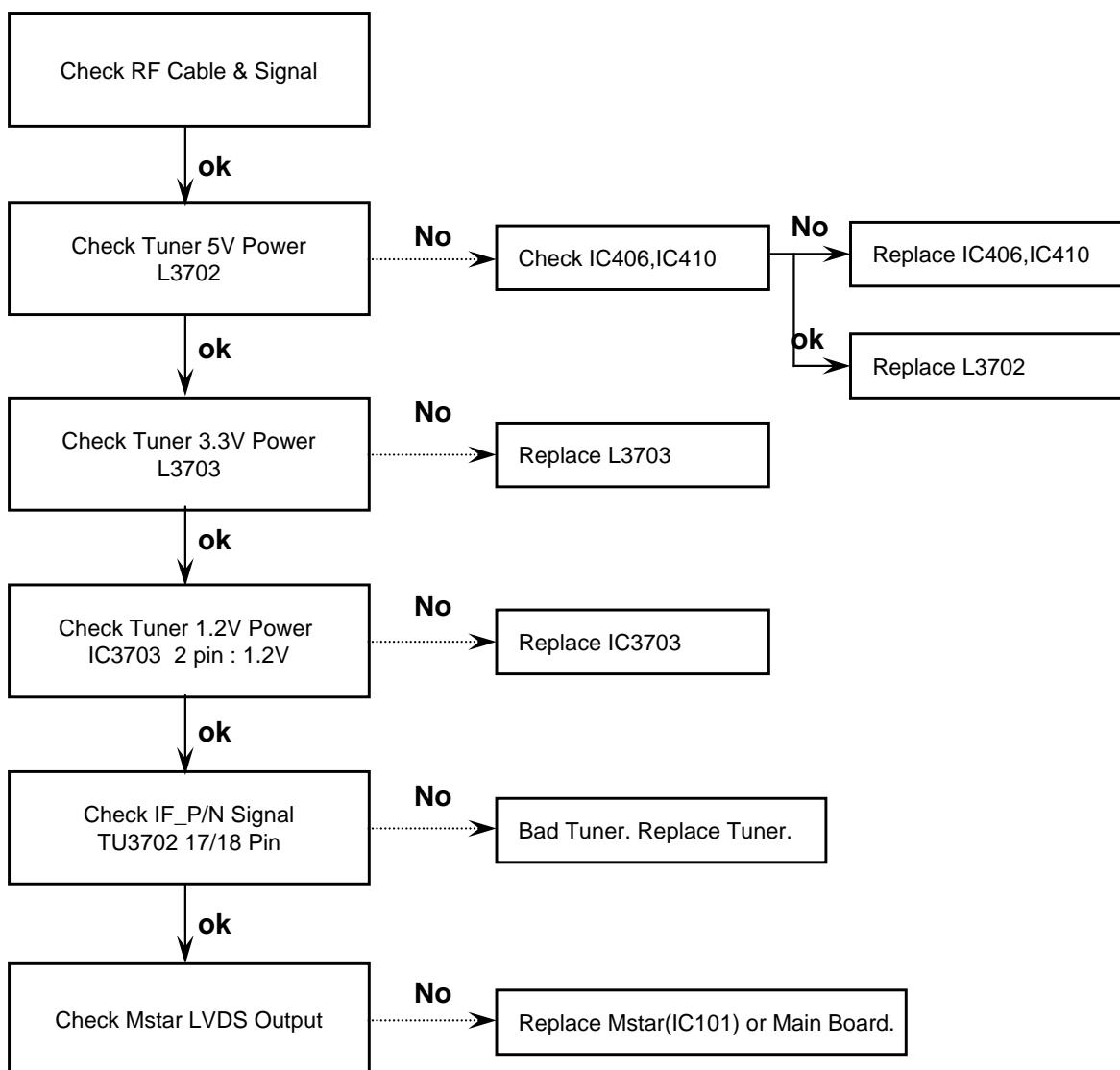




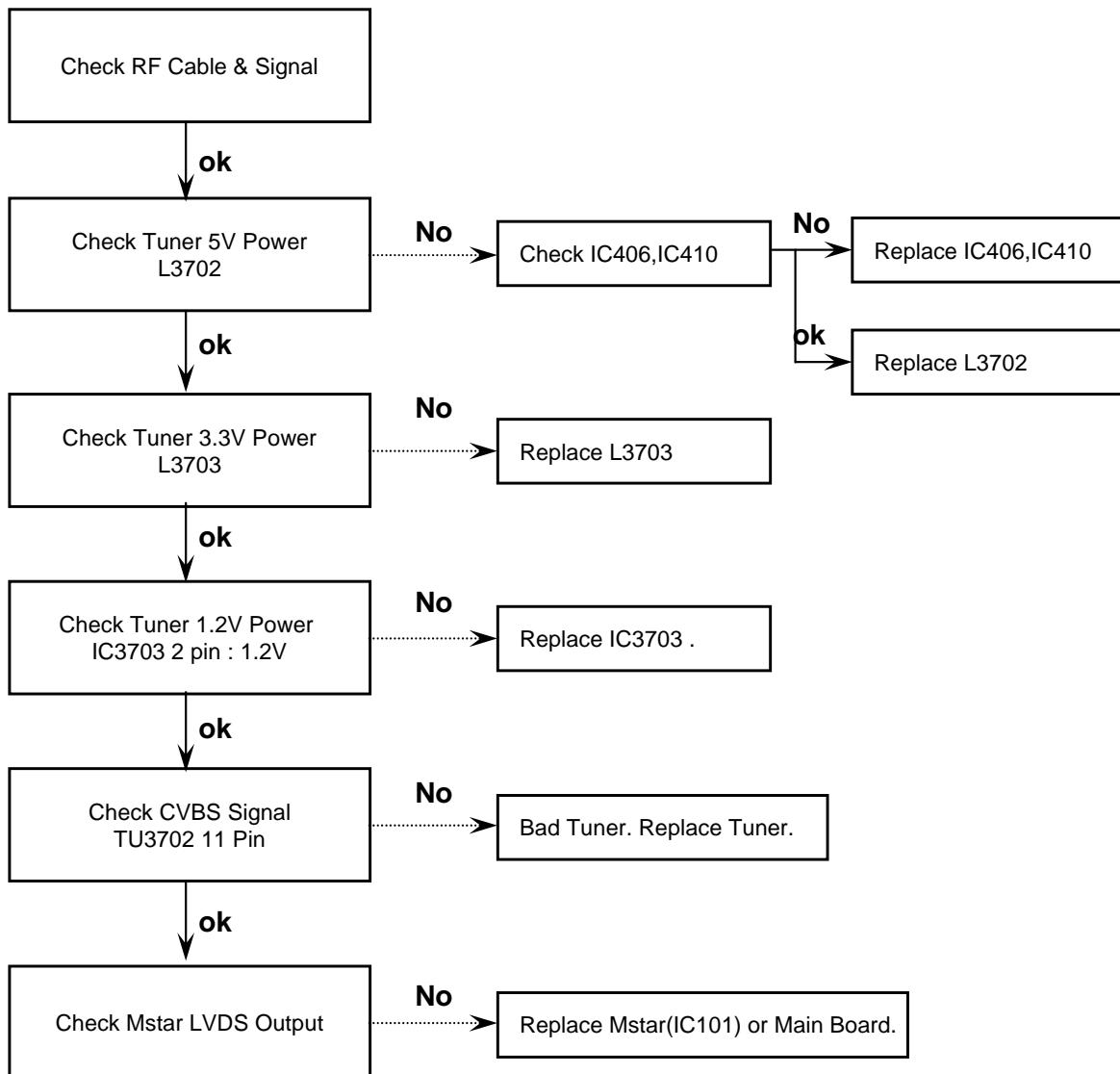
# 1. Power-up boot check



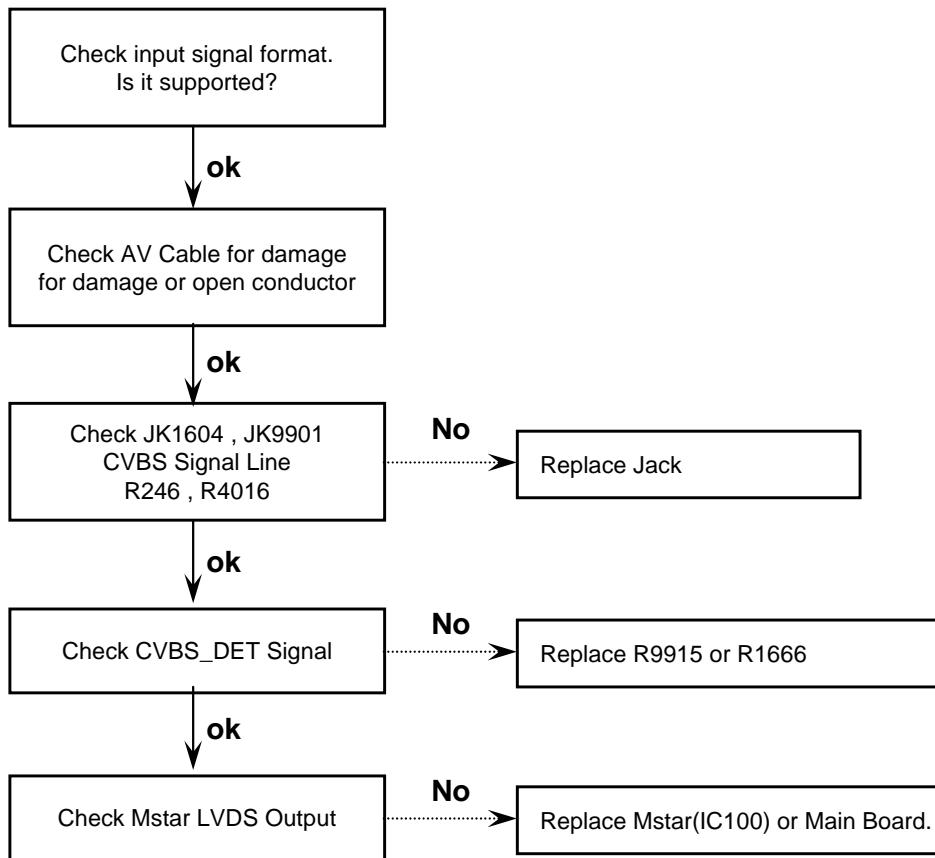
## 2. Digital TV Video



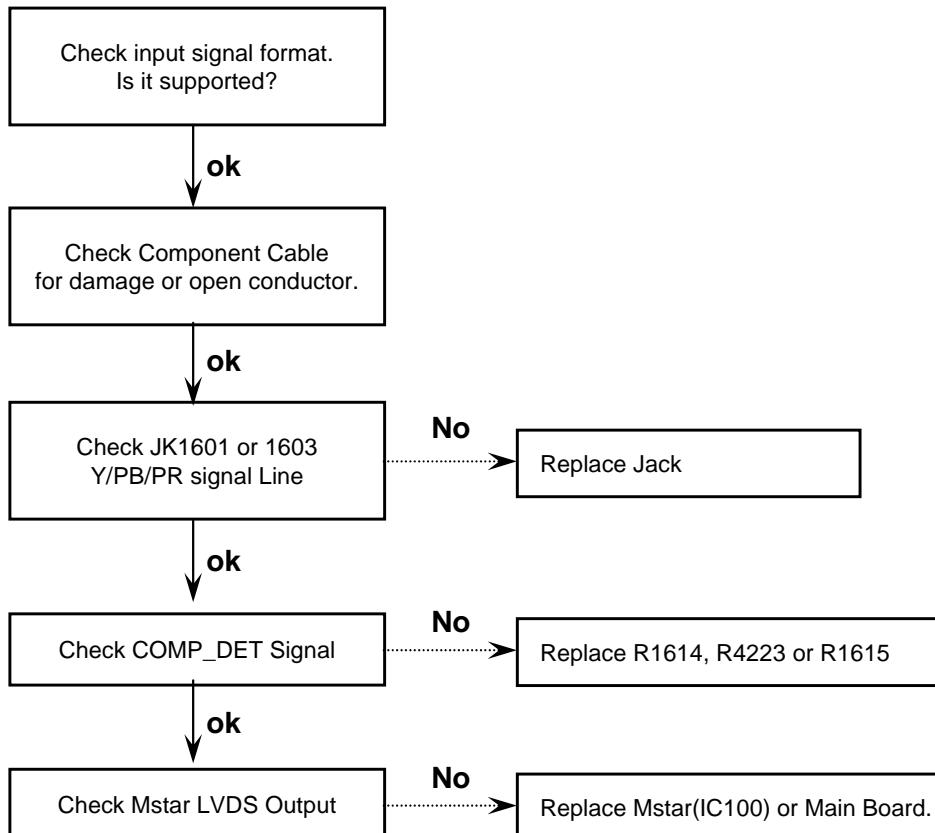
### 3. Analog TV Video



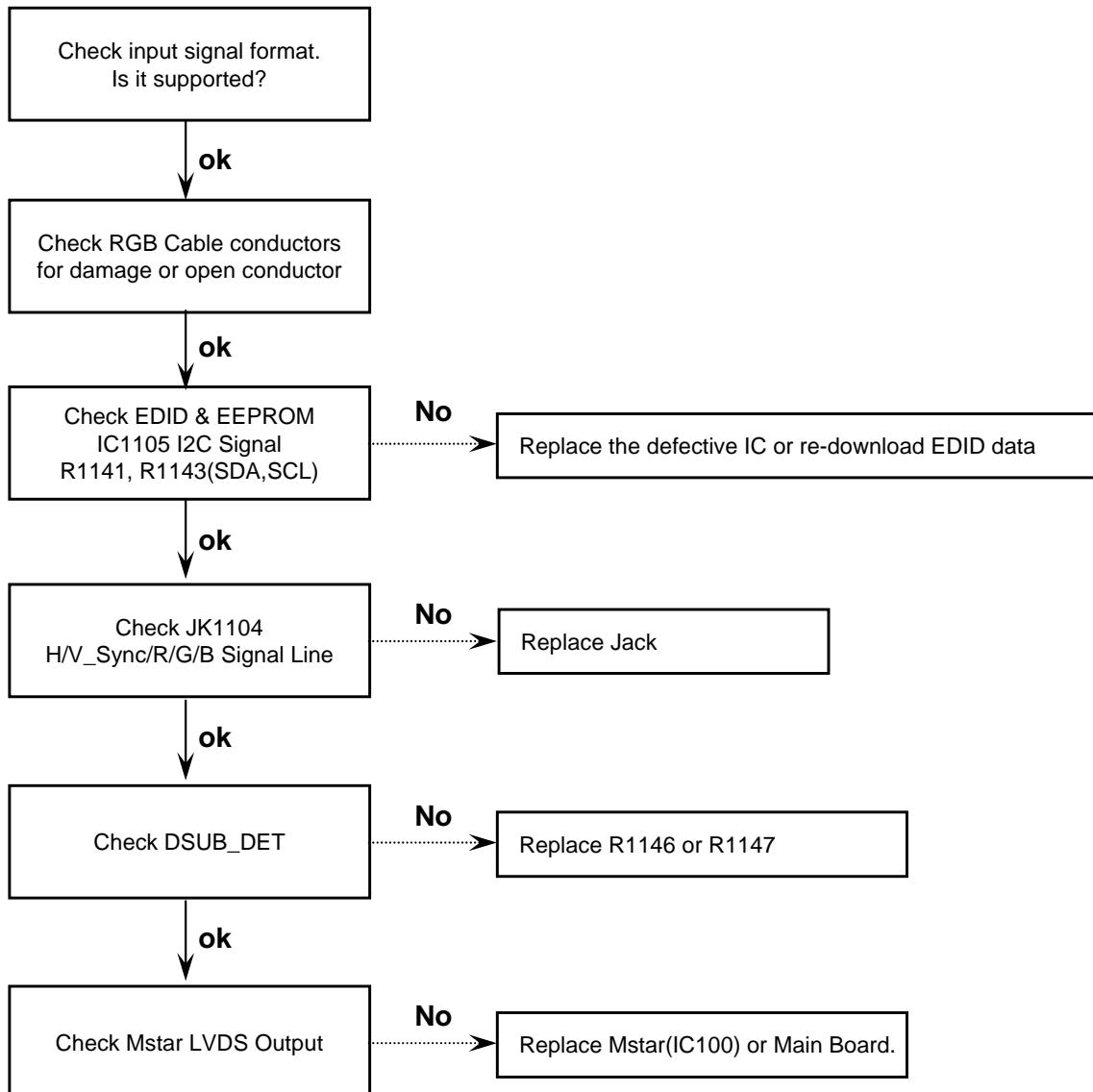
## 4. AV Video



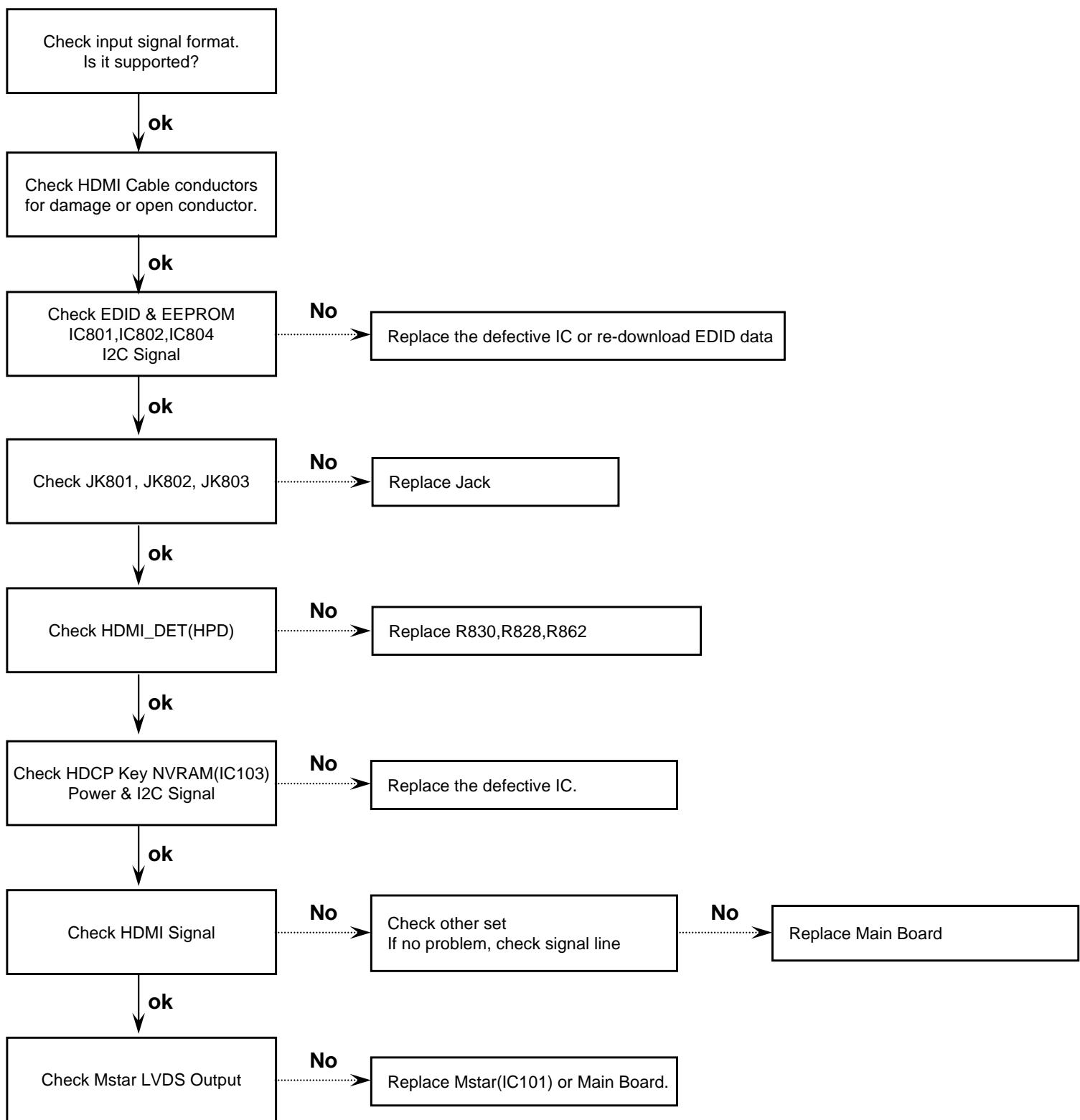
## 5. Component Video



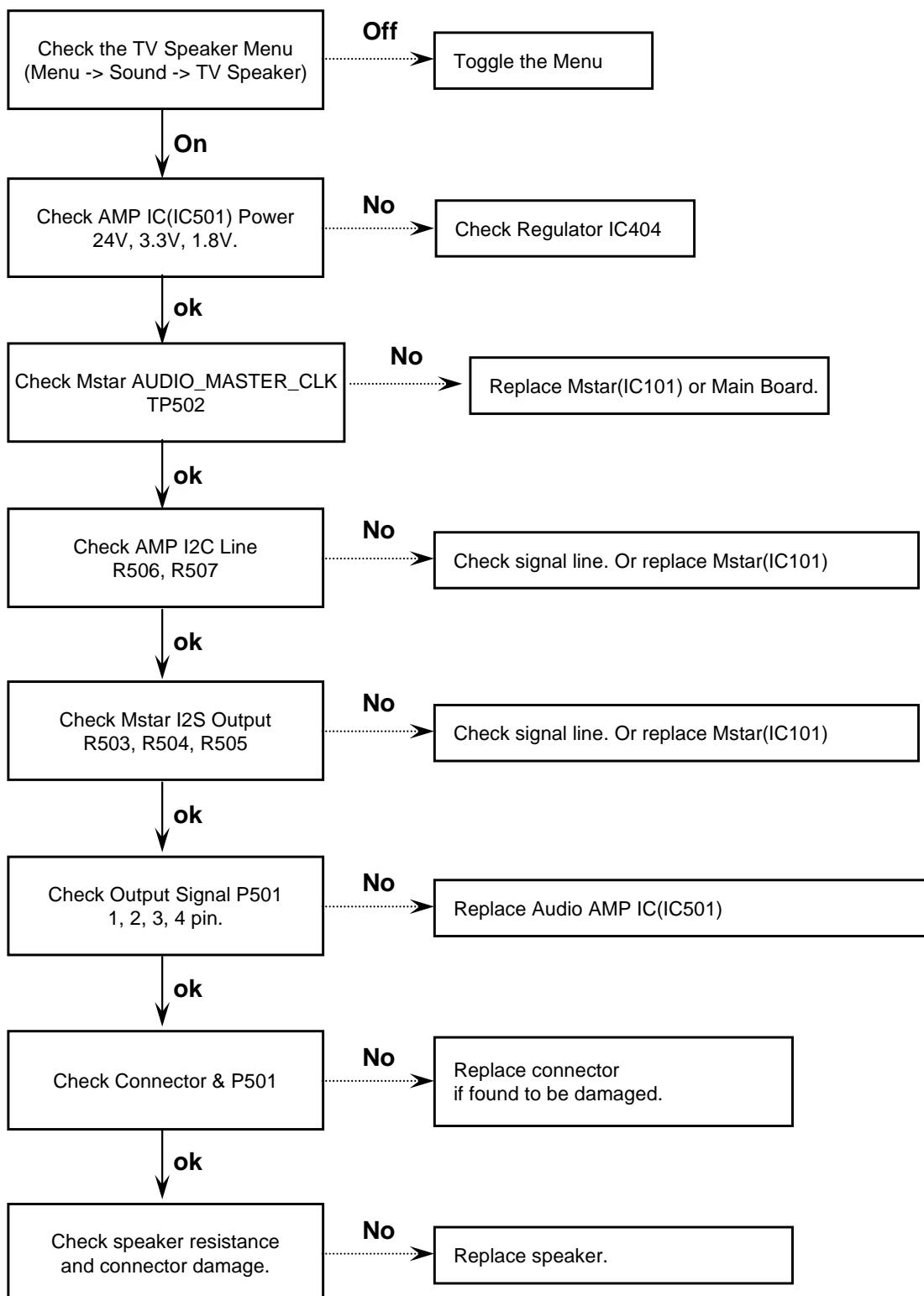
## 6. RGB Video



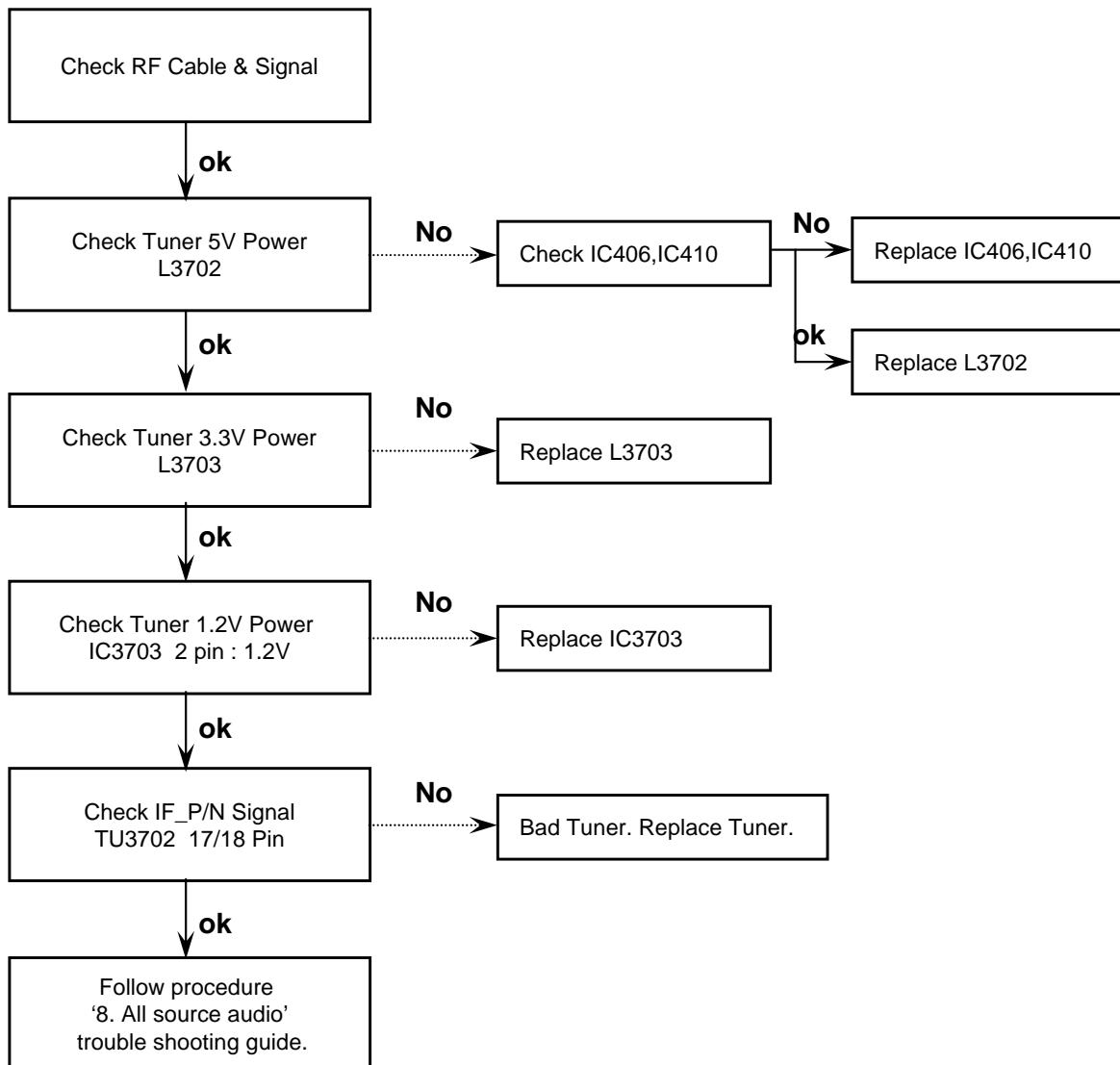
## 7. HDMI Video



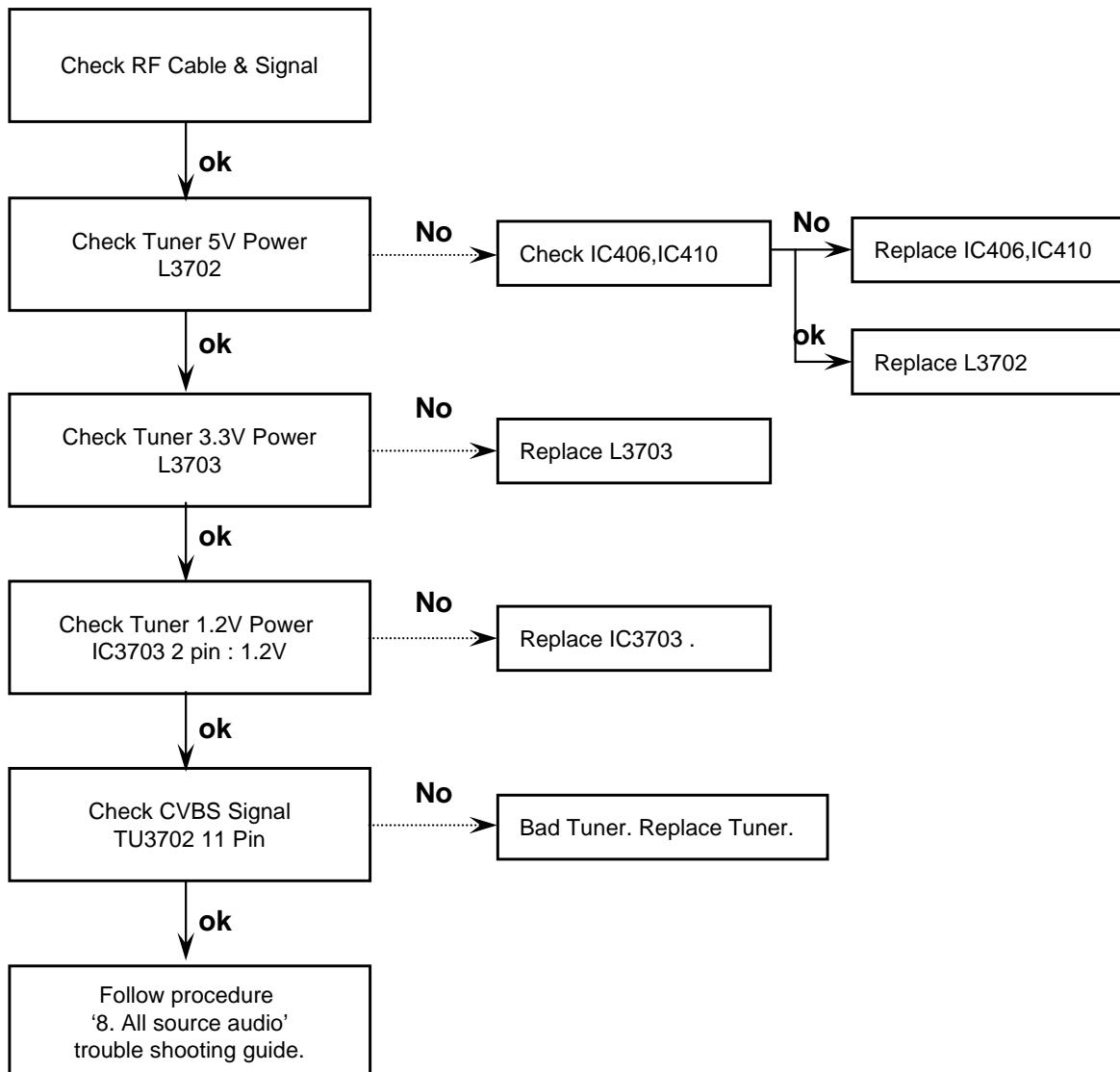
## 8. All Source Audio



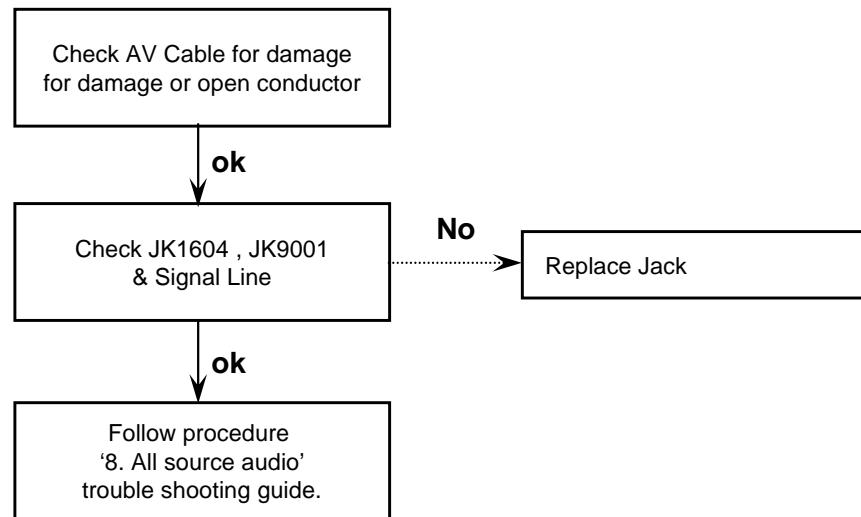
## 9. Digital TV Audio



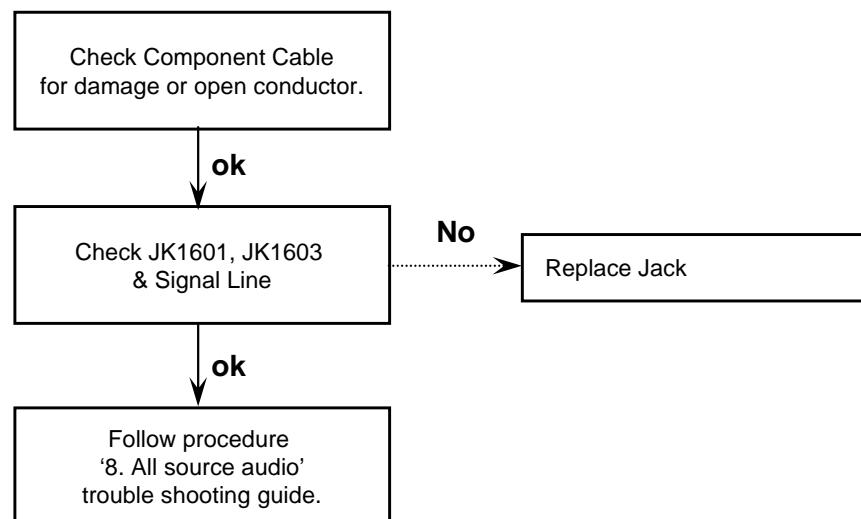
## 10. Analog TV Audio



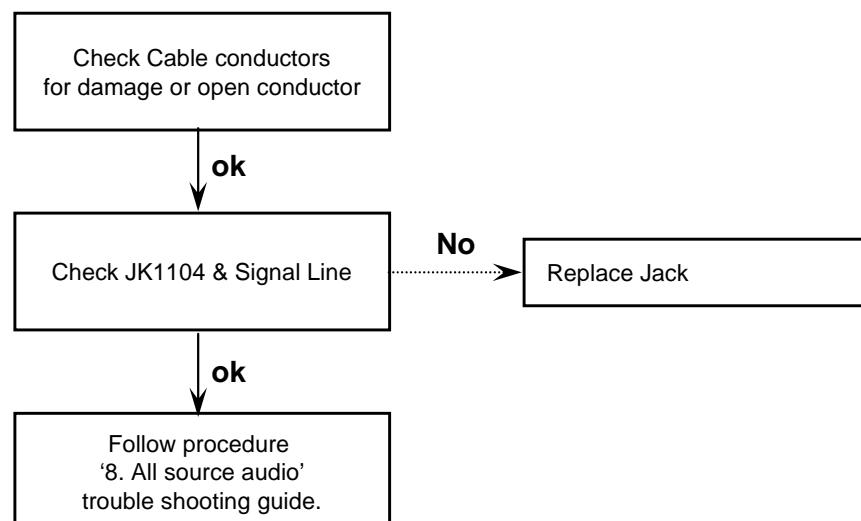
## 11. AV Audio



## 12. Component Audio



## 13. RGB Audio



# GP3 Carry Over 모델 Block Diagram



LG Electronics / LCD TV 연구소  
연구 1실 / AT1 그룹

